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# High School Wildlife Education Through A First Job Experience: An Evaluation of Rosamond Gifford Zoo's ZooGuides Program

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HIGH SCHOOL WILDLIFE EDUCATION THROUGH A FIRST TIME JOB  
EXPERIENCE: AN EVALUATION OF ROSAMOND GIFFORD ZOO'S ZOOGUIDES  
PROGRAM

by

Jade Johnson

A thesis  
submitted in partial fulfillment  
of the requirements for the  
Master of Science Degree  
State University of New York  
College of Environmental Science and Forestry  
Syracuse, New York  
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Department of Environmental and Forest Biology

Approved by:  
Elizabeth E. Folta, Co-Major Professor  
Melissa K. Fierke, Co-Major Professor  
Anne C. Godfrey, Chair, Examining Committee  
Neil Ringler, Interim Department Chair  
S.Scott Shannon, Dean, The Graduate School



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## Abstract

J. L. Johnson. High School Wildlife Education Through A First Job Experience: An Evaluation of Rosamond Gifford Zoo's ZooGuides Program, 173 pages, 23 tables, 22 figures, 2018. APA style guide used.

There are many gaps in research within the field of zoo education. One of those gaps is the experience of young educators onsite. The Rosamond Gifford Zoo's ZooGuides program hires 20 high school students each year to educate guests onsite throughout the summer. This study evaluated whether Zoo Guides increased wildlife knowledge, interest in wildlife, interest in wildlife careers, ability to educate guests, and gained relevant workplace skills as a result of the program. This evaluation found most Zoo Guides did increase knowledge, interest in wildlife, interest in related careers, ability to educate guests, and gained workplace skills as a result of the program. However, working on exhibit did not always have higher impacts than training alone.

*Key words: environmental education, program evaluation, wildlife education, zoo education, experiential education, professional development*

J. L. Johnson

Candidate for the degree of Master of Science, April 2018

Elizabeth Folta, Ph.D.

Melissa Fierke, Ph.D.

Department of Environmental and Forest Biology

State University of New York College of Environmental Science and Forestry,  
Syracuse, New York

## **CHAPTER 1: INTRODUCTION**

### **OVERVIEW**

Zoos have become an integral part of contemporary conservation, in part because they provide powerful and unique conservation education opportunities for zoo guests (Mony & Heimlich, 2008; Ogden & Heimlich, 2009; Jensen, 2014; Matiassek & Luebke, 2014). Zoos have existed in some form possibly as far back as 2500 BCE (Rutledge, McDaniel, Boudreau, Ramroop, Teng, Sprout, Costa, Hall, & Hunt, 2011). However, education has only been integrated into zoo activities in a standardized way in the United States since the 1970s (De White, Jacobson, & Kay, 1994; Ogden & Heimlich, 2009; Davidson, Passmore, & Anderson, 2010; Marino, Lilienfeld, Malamud, Nobis, & Broglio, 2010). Because the field of zoo education is in its infancy, it has not been well studied. Studies demonstrating the educational impact of zoos are limited and large gaps of knowledge exist, including what guests learn when they visit zoos and whether guests change their attitude and behavior as a result of visiting zoos (De White, et al., 1994; Kruse & Card, 2004; Mony & Heimlich, 2008; Ogden & Heimlich, 2009; Randall, 2012; Marino, et al., 2010; Pearson, Dorrian, & Litchfield, 2013; Jensen, 2014; Schulz & Joordens, 2014). The majority of the research on zoo education focuses on zoo guests. This research is valuable because a key part of any zoo mission statement, especially those accredited by the Association of Zoos and Aquariums (AZA), includes wildlife and conservation education for guests (Patrick, Matthews, Ayers, & Tunnicliffe, 2007; Packer & Ballantyne, 2010). Unfortunately, most of this research does not incorporate the actual

educators into the data gathered. Young educators have been largely ignored in research (Bixler, Joseph, & Searles, 2014).

Some of the personal interpretation guests receive from zoos comes from volunteers and paid or unpaid interns acting as informal educators (Marcussen, 2002). Often, these educators are high school or college students (Pyatt, Rosser, & Powell, 2009; Hajnys, 2012; Moore, Warta, & Erichsen, 2014). It is possible that these informal educators are relatively inexperienced in environmental education and may not have had any previous working experience. Additionally, they may not have a strong background in biological concepts or awareness of conservation issues. Many of these novice educators have also never interacted regularly with strangers. Despite this, they are expected to educate guests about the zoo in an engaging and meaningful way. These young individuals require training, which must prepare them for these tasks. Not just guests, but also the inexperienced educators, themselves, might receive an informal educational experience in zoology and conservation. For many of these young people, working as a volunteer, intern, or paid guide is the first step towards a career in working with animals. Should not the informal educational experience of these young people be examined?

## PURPOSE OF STUDY

Rosamond Gifford Zoo's ZooGuides program offers an opportunity to evaluate first time wildlife educators. Individuals who participate in the program generally have no previous experience in the workforce and do not necessarily have any previous interest in wildlife or broader scientific topics. Zoo Guides eventually interact directly with onsite guests so they must not only gain knowledge about the zoo and its animals, but confidence and skills needed to engage with hundreds of guests and to make their visit more of an

enjoyable and educational experience. By the end of the ZooGuides program, they are expected to have gained skills that will not only serve them in conservation, education, and other Science Technology Engineering and Math (STEM) careers, but all future job opportunities.

Rosamond Gifford Zoo's teen Zoo Guides are from an urban background, adding depth to their informal environmental education. Syracuse is a small city surrounded by many state parks and forested land; however, contact with nature and wildlife is still inaccessible for many young people living within urban boundaries (Baker, 2000; Strife & Downey, 2009). Visiting the zoo as a child and working there as a high school student may give these young people contact with wildlife that they would never receive otherwise (Packer & Ballantyne, 2010; Rosalino & Rosalino, 2012; Belz, 2014). Thus, these urban high school students may not have as much of a background in wildlife and environmental knowledge as their suburban and rural contemporaries. To educate the public about animals on exhibit, Zoo Guides have to be confident in their own knowledge. Thus, their training and experiential learning through the program is key and should be analyzed and evaluated.

## STUDY GOAL AND OBJECTIVES

The goal of this evaluative study was to both quantitatively and qualitatively determine the educational and professional progress Zoo Guides make throughout the course of the program. This goal was achieved through five objectives:

1. Evaluate biological knowledge at three significant points during the program; before training, after training, and at the end of the work season.

Research question: Do Zoo Guides increase their biological knowledge as a result of the program?

2. Evaluate interest in wildlife and wildlife conservation at three significant points during the program; before training, at the end of training, and at the end of the work season.

Research question: Do Zoo Guides increase their interest in wildlife and wildlife conservation as a result of the program?

3. Evaluate awareness and interest in wildlife related careers as a byproduct at three significant points during the program; before training, at the end of training, and at the end of the work season.

Research question: Do Zoo Guides increase their awareness and interest in related careers as a byproduct of being in the program?

4. Evaluate the ability of Zoo Guides to convey their knowledge in an interesting and educational way to guests at many points during the four months of the work season.

Research question: Do Zoo Guides increase their ability to educate guests in an engaging and effective way?

5. Evaluate the Zoo Guides' relevant workplace skills at three significant points during the program: before training, after training, and at the end of the work season.

Research question: Do Zoo Guides gain relevant workplace skills as a result of the program?



## RESEARCH HYPOTHESES

This evaluation hoped to provide a better understanding of how volunteer, intern, and related programs allow youth to fill the role as informal science educators for the first time. In addition, the ZooGuides program has received highly positive responses for the execution of its mission (N. Keefe, personal communication, March 1, 2017). However, it had never been formally evaluated before. This study can provide valuable insights in its efficacy and reasoning for the continuation of the program. The following hypotheses were created to address the study's five research questions:

The Zoo Guides will increase the following as a result of the ZooGuides program:

1. Biological knowledge
2. Interest in wildlife and wildlife conservation
3. Awareness and interest in related careers
4. Ability to educate guests in an engaging and effective way
5. Relevant workplace skills

It was also hypothesized that working for four months on exhibit would have a higher impact on Zoo Guides' educational and professional development than five weeks of training. These hypotheses were created based on Kolb's (1984) Experiential Learning Theory (ELT). ELT uses a learning cycle comprised of four processes (Fig. 1.1). Concrete experience entails learning through engaging in direct experiences as opposed to learning indirectly, such as learning by hearing about someone else's experience (Kolb, 1984). Zoo Guides were expected to develop primarily through having concrete experiences while working rather than through indirect experiences during training. The impacts of training and working were tested separately to determine the effect of having concrete experiences.

After one has a direct experience, reflective observation follows, which allows the individual to learn by reflecting on the experience and relating it to past experiences (Kolb, 1984). Reflection was tested by requesting Zoo Guides to evaluate their skills and interests, as well as discuss how the ZooGuides program has impacted them. Abstract conceptualization follows next, which entails distilling reflections from continuing experiences into concepts and skills (Kolb, 1984). Conceptualization was also tested by giving the Zoo Guides the opportunity to demonstrate and discuss the impact of ZooGuides program, not only on their lives, but on the lives of the guests. This conceptualization leads to experimentation of new understanding and skills through action, which leads to more direct experience (Kolb, 1984). Active experimentation was tested by allowing the Zoo Guides to demonstrate how they have improved over the course of the 2017 program, from both their perspective, and the perspective of their supervisors and guests.

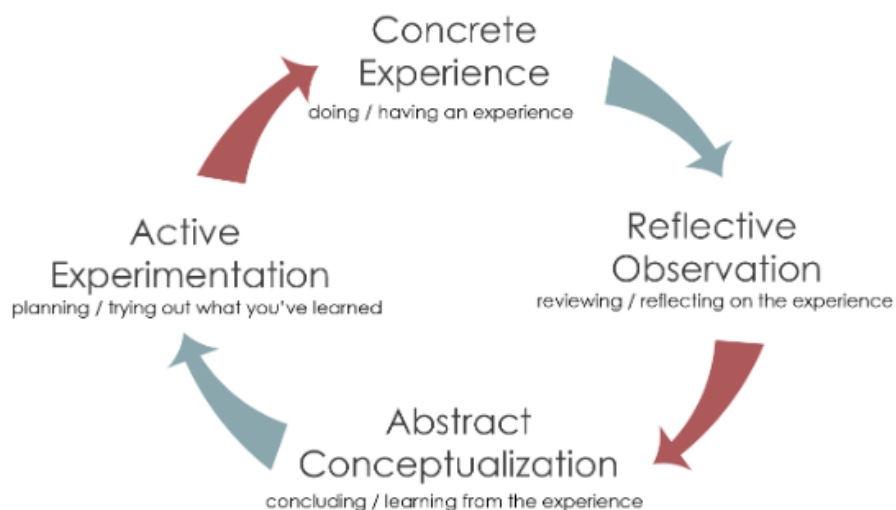


Figure 1.1: Kolb's Experiential Learning Theory Learning Cycle. Reprinted from "Kolb's Experiential Learning Theory" in *Reflection Models*. Retrieved April 12, 2018, from <https://csl.ku.edu/reflection-models#kolb>. Copyright n.d. by The University of Kansas Center for Service Learning. Reprinted with permission.

This thesis, in the form of an evaluation, begins with a literature review providing background information relevant to the understanding of the study. Methods are then explained to describe the study site, study participants, data collection, and data analyses. Results are presented graphically and organized according to research question. The discussion section interprets results with the support of past research and analyzed for implications with recommendations for the program. The conclusion chapter will summarize the findings of this study.

## DEFINITIONS

*Modern Zoo* - a “purposeful collection of animals used to further the cause of conservation through systematic education and research” (Rabb, 2004).

*Urban* - “areas that are very developed, meaning there is a density of human structures such as houses, commercial buildings, roads, bridges, and railways” (Rutledge, et al., 2011).

*Suburban* - “an outlying district of a city, especially a residential one (“Suburb”, 2018).

*Rural* - “a subset of non-urbanized areas, as open country and settlements with fewer than 2,500 residents (Lance, 2008).

*Zoo Guest or Guest* – this term is used instead of zoo “visitor” because guest is becoming the preferred terminology among zoo education practitioners and researchers (Marcussen, 2002; Ogden & Heimlich, 2009; Bixler, Joseph, & Searles, 2014; Marshall, 2016).

*Zoo Guides* - this term is used because Zoo Guides are paid and not volunteers. As participants of the ZooGuides program, they are the primary focus of this study.

*Biofact* – “an object such as bones, furs, eggs, that is a product of a biological agent” (Kisich & Rudovsky, 1999).

## **CHAPTER 2: LITERATURE REVIEW**

### **INTRODUCTION**

This literature review will cover the relevant literature necessary to understand the purpose of this evaluative study, how it was developed, and its implications. I begin by introducing Kolb's 1984 theory of Experiential Learning Theory (ELT). This theory is the basis for forming background knowledge of this study because the Zoo Guides are gaining knowledge, awareness, attitude adjustments, and skills aligned with the five study objectives through their experiences training and working in the ZooGuides program. This theory is then applied to current knowledge on zoo education. Because the Zoo Guides are young individuals living in an urban environment, ELT is examined in terms of the broader topic of environmental education. Because this study is evaluative, current practices in evaluating environmental education programs are explained. ELT is then related to relevant youth working experiences because the ZooGuides program is the first job experience for most of its Zoo Guides.

### **OVERVIEW OF EXPERIENTIAL LEARNING**

David A. Kolb (1984) first published his Experiential Learning Theory in 1984 with his book, "Experiential Learning: Experience as the Source of Learning and Development." This theory puts heavy emphasis on experience in the process of learning. It draws upon previous models put forth by John Dewey, Kurt Lewin, and Jean Piaget.

John Dewey (1938) was one of the first prominent figures in education research to consider the role of experience in education. Dewey critiqued past educational philosophies, such as the idea that students may be born with or without intellect and that they must work hard to make up for any gaps in natural ability to obediently receive what

is taught in classrooms. He also critiqued the notion that information should be taught in classrooms to achieve a fixed point of knowledge. He argued that making education more personal by acknowledging and incorporating students' personal experiences, both internal and external, would enrich their ability to learn. Not all experiences are beneficial for the student and not all contribute equally to learning. Continuity, as he describes, results from a discrimination of experiences that will lead an individual from continuing to learn in one direction or another with no defined end. Discrimination of experiences depends on their quality. Experiences that are purposeful, and ignite curiosity and initiative are likely to lead to a continuation of learning. It is the role of the educator to determine the direction of students' learning and to facilitate experiences that will further the continuation of learning in a desired direction.

Kurt Lewin (1946) was not strictly an education scholar, but his ideas are applicable to education and learning. Lewin was concerned with social change and social research. One of his most prominent works concerned Action Research, which applies to behavior change. Lewin argued that researchers interested in solving social issues need to participate in the problem-solving process. He created a feedback loop model (Fig.2.1) that involves acknowledgement of a problem (unfreezing), investigation of solutions through behavior change (changing), and reinforcement of new behavior (refreezing). This process not only involves the facilitator, but also participants through self-reflection. This Action Research model can be applied to an educational setting involving educators and students.

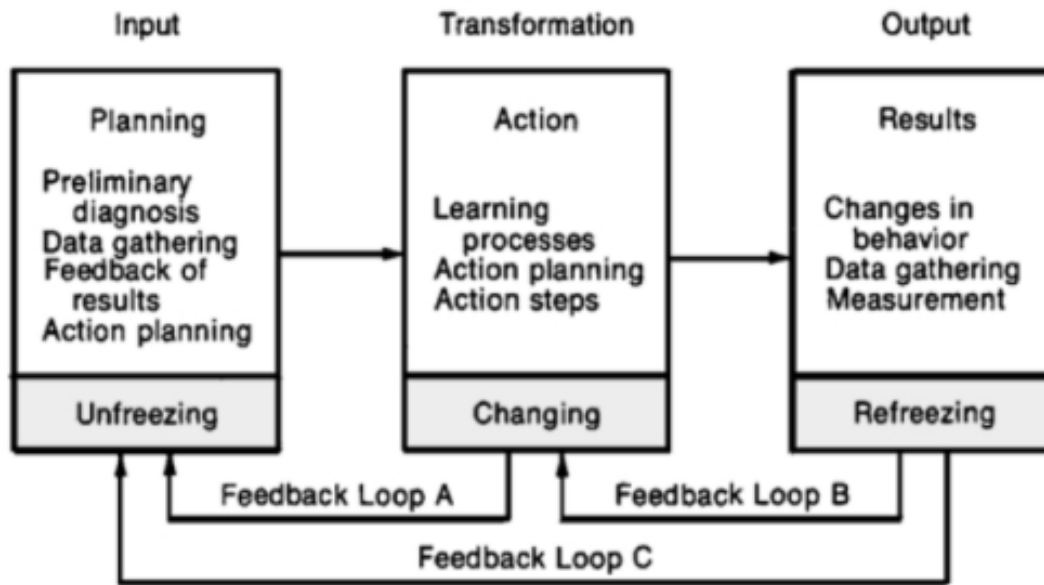


Figure 2 1: Lewin's Action Research Cycle. Reprinted from "Methodology" in *PHEExcel- Testing the Feasibility of a Quality Label for Professional Higher Education Excellence*.

Retrieved April 12, 2018, from <https://www.eurashe.eu/projects/phexcel/>. Copyright 2015 by European Association of Institutions in Higher Education. Reprinted with permission.

Appel & Goldberg (1977) summarized contributions of Jean Piaget, another prominent figure in developmental psychology and education research. Piaget wrote about many theories with direct applications to experiential learning. His Theory of Cognitive Development is one such theory. Similarly to Dewey, Piaget rejected the concept of students learning strictly by receiving information with no personal input. He argued that personal experiences have direct impact on learning. He identified two processes of learning from experiences: assimilation and accommodation. Assimilation is the process of adapting new information from experiences into constructs created from past experiences. Accommodation is the process of adapting constructs created from past

experiences to incoming information from new experiences. Cognitive development and learning involves a balance between both of these processes and is a continuous process, in itself, as new experiences arise. When assimilation is dominant over accommodation, this results in abstract, creative thinking. When accommodation is dominant over assimilation, this results in imitation. This process is a cycle involving interactions with environmental information resulting in changing conceptualization, called equilibration (Fig. 2.2). In educational applications, educators must understand that every interaction a student experiences contributes to learning. Thus, it is up to educators to decide what types of experiences to give to students facilitating the learning process.

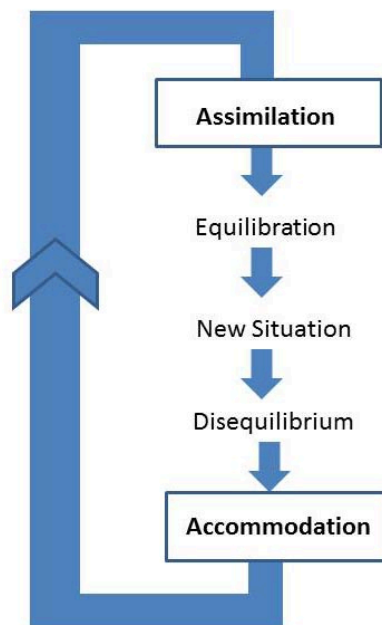


Figure 2.2: Model of Equilibrium from Piaget's Theory of Cognitive Development. Reprinted from "Example of Assimilation" in *Jean Piaget*. Retrieved April 12, 2018, from <https://www.simplypsychology.org/piaget.html>. Copyright 2015 by Saul McLeod. Reprinted with permission.

David Kolb (1984) drew from Dewey's, Lewin's, and Piaget's theories to construct an updated theory on experiential learning. One of the key concepts that Kolb drew from previous models and theories is the emphasis on the process of learning, as opposed to the outcome. Kolb maintains, as part of ELT, that knowledge does not accumulate to form fixed ideas. Instead, ideas are constantly shifting, molding, and changing from continuous experiences. This draws from similar cyclical models created by Dewey, Lewin, and Piaget. After having concrete experiences by interacting with the environment, individuals reflect on these new experiences, conceptualize reflections in terms of past conceptualizations, and use formed concepts to make decisions and experiment, which allows individuals to have more novel experiences (Fig.1.1). This entails that a learner is learning in every new situation. Furthermore, the process of learning through experience is subjective, different for every individual because no two individuals have had the exact same experiences. This has implications for attitude and behavior change because individuals form new conceptualizations, which leads to new actions and behavior. ELT has been used in environmental education research in order to study how concrete experiences contribute to increased environmental knowledge and pro-environmental behavior change (Vos, 2001; Haluza- Delay, 2001; Umholtz, 2013; Stevenson & Peterson, 2015; Delia & Krasny, 2018). These studies concluded that having concrete environmental experiences do lead to increased knowledge and pro-environmental attitude and behavior change. This implies that the ZooGuides program will have the same effect on Zoo Guides because they had concrete experience interacting with zoo guests onsite.



## EDUCATION WITHIN ZOOS

Modern zoos are an appropriate place to observe experiential learning because visiting a zoo and gaining direct experience with wildlife within an educational facility provides an opportunity for guests to learn. However, zoos did not always facilitate learning the way that they do now.

Rutledge, et al. (2011) describes the history of zoo transformation into what it is today as follows. When the first modern zoos were created, possibly as far back as 2500 BCE, they more closely resembled museums for people to observe wild animals. The purpose of zoos being to provide people with the opportunity to observe wild animals continued through the mid 20<sup>th</sup> century. When environmentalism became a public interest in the 1970s, zoos shifted their focus towards conservation.

The Association for Zoos and Aquariums (AZA) was created in the United States in 1971 in response to the need for higher animal welfare standards within zoos (“About AZA Accreditation”, 2018). AZA standards maintain conservation initiatives, such as the Species Survival Plan (SSP), which involves accredited institutions cooperating to manage breeding and enrichment programming for species at risk (“Species Survival Plan Programs”, 2018). These standards also call for education practices (Patrick, et al., 2007; Bixler, et al., 2014; Jensen, 2014; Roe & McConney, 2015; “About AZA Accreditation”, 2018). Zoos and aquariums receive an accreditation when they pass AZA standards. 232 institutions, including the Rosamond Gifford Zoo, are accredited as of April 2018 (“Currently Accredited Zoos and Aquariums”, 2018).

Because education standards within zoos have not existed for long in relation to the history of zoos, zoo education is a burgeoning field of research. Researchers have

examined guest motivation and the reasons as to why guests come to zoos (Marino, et al., 2010; Packer & Ballantyne, 2010; Roe & McConney 2015), as well as the lasting educational effects of visiting zoos (Packer & Ballantyne, 2010), and how guests respond to concept interpretation from zoos (Marcussen, 2002). Zoos intend for the conservation messages they portray to lead to increased knowledge, which in turn leads to action and behavior change (Ogden & Heimlich, 2009). However, whether guests seek out education when they visit zoos and leave with knowledge that changes attitude and behavior has long been contested (De White & Jacobson, 1994; Kruse & Card, 2004; Mony & Heimlich, 2008; Randall, 2012; Marino, et al., 2010, Pearson, et al., 2013; Jensen, 2014; Schulz & Joordens, 2014). There is evidence to suggest that most guests come to zoos with the intention to learn to some extent, but this has not been evaluated well (Roe & McConney, 2015). Furthermore, they may visit with more interest in the aesthetic appeal of wildlife than conservation of species (Heimlich & Horr, 2010).

There is strong evidence that guests increase biological knowledge as a result of visiting zoos (Randler, Kummer, & Wilhelm, 2012; Buchanan-Smith, 2012; Jensen, 2014), but it is questionable as to whether visiting zoos has long-term effects regarding behavior and knowledge (Marino, et al., 2010). People who visit zoos may already have a precondition to be environmentally inclined, but guests still come from diverse backgrounds and experiences (Packer & Ballantyne, 2010). Reinforcement of knowledge through interpretive means may achieve the best educational results (Packer & Ballantyne, 2010). There are thought to be five different types of zoo guests. Explorers are driven by curiosity, facilitators focus on enhancing the experience of others in their group, professional hobbyists find passion in their visits, experience seekers find satisfaction in

visiting important sites, and spiritual pilgrims visit with the intention of relaxation (Falk, Reinhard, Vernon, Bronnenkant, Heimlich, & Deans, 2007). Because guests come from diverse backgrounds and visit zoos with different motivations, it is best for zoos to provide many different types of educational experiences for different types of guests (Falk, et al., 2007). There is evidence that guests rely heavily on direct communication with young or seasonal zoo education staff, including guides and volunteers, to receive education while visiting zoos (Roe, McConney, & Mansfield, 2015). Oftentimes when interacting with an onsite educator, zoo guests are not aware of the specific role of the educator (Mony & Heimlich, 2008). The educator could be a staff member, an intern, or possibly a volunteer, but guests do not necessarily differentiate among personnel (Mony & Heimlich, 2008). Guests trust information they receive from zoo personnel they speak with and perceive them as vessels of the zoo's mission (Mony & Heimlich, 2008).

However, much of the time education staff may seem untrained and poor at communicating (Roe et al., 2015). Despite this, studies have also shown that visiting zoos with an educational guide leads to increased understanding of biological concepts and an enhanced commitment to wildlife conservation (Swanagan, 2000; Livermore, 2013; Jensen, 2014), but there is a difference between efficacy of staff and volunteers. Interacting with volunteers has been shown to increase knowledge, but not to necessarily increase positive change in students' attitude (De White, et al., 1994). This might be because when volunteers educate zoo guests, they tend to focus on facts about animals on exhibit, but do not expand on broader conservation messages and other key messages (Mony & Heimlich, 2008). Other limitations in volunteer efficacy are the ability to connect with guests through cultural sensitivity and level-appropriate language (Pyatt, et

al., 2009). Interestingly, while the average volunteer is middle aged, guests report having greater satisfaction from interactions with younger volunteers (Pyatt, et al., 2009). Visiting without an educational guide, such as a volunteer, can lead to decreased understanding (Livermore, 2013; Jensen, 2014). Guests may interpret zoo animals with their own background knowledge, even with the presence of informative labels and signage (Tunncliffe & Scheersoi, 2012). Thus, educators at zoos, including volunteers, serve a valuable purpose, but their efficacy depends on many factors, such as the quality of training (Bixler, et al., 2014; Roe et al., 2015)

Education staff can provide educational experiences beyond signage, such as the encouragement of conservation and interpretation, which is the facilitation of intellectual and emotional connections with a subject (Brochu & Merriman, 2015). Guests and zoo educators receive a higher educational experience from open-ended inquiry-based interpretation, which requires higher use of cognitive skills and understanding (Marcussen, 2002). Engaging guests in conversation motivates them to consider concepts they might not do on their own (Idema & Patrick, 2016). However, for guests to continue those conversations after the educator leaves, and again once they leave the zoo, it is important to ask thought provoking questions (Idema & Patrick, 2016). The way zoo knowledge is interpreted to guests affects their attitudes upon leaving zoo (Randall, 2012).

It is particularly important to be attentive to how to engage children in zoo education, as one of the primary target audience of zoos. Seeing live animals in action draws a good deal of interest, but the ability to touch an animal or an animal artifact draws even greater interest (Stanford, 2014). This provides experiential education through physical interaction that forges tangible connections with zoo animals. Additionally, it is

thought that children visit zoos with the expectation of learning, but that adults do not (Heimlich & Horr, 2010). Adults are more likely to learn when it is unintentional through reflection (Heimlich & Horr, 2010). Therefore, it is not enough to know the information conveyed to guests, but also to be aware of how to convey that information to guests of all ages.

## ENVIRONMENTAL EDUCATION FOR URBAN POPULATIONS

Environmental education research frequently focuses on urban populations. Urban residents have been reported to be less aware of conservation issues and have limited wildlife knowledge since they have less direct experience with wildlife, though they have favorable interest in these topics (Baker, 2000; Olive, 2014). Thus, urban residents may be well intentioned in their concerns about conserving wildlife, but have less knowledge of how to act on their concern.

For teenagers who have grown up in an urban environment, it may be particularly difficult to form connections with nature, again because they have lacked direct experience outside of an urban landscape since childhood. For this reason, places such as zoos and parks may be particularly important in developing a realistic perspective of the natural world. Long term exposure through direct observation of wild animals and examples of natural habitats can improve urban youth's understanding of the environment (De White & Jacobson, 1994). However, there are still significant limitations to this exposure, such as the financial limitations of visiting zoos and aquariums regularly (Bruyere, Wesson, & Teel, 2012). In addition, having direct contact with wildlife, especially common wildlife found in their own urban neighborhoods, allows young people to form emotional connections (Fisman, 2004; Watson, 2006), but they may need to

address feelings of safety in their neighborhoods before they can form these connections (Fisman, 2004). Several organizations and initiatives, such as Outward Bound and the Cornell University Cooperative Extension, exist to give urban youth wilderness skills and experiences within cities (Tidball & Krasny, 2010). For example, Outward Bound runs programs for young adults in the wilderness, as well as programs in which students learn mapmaking and journaling while taking public transportation and sleeping in museums (Tidball & Krasny, 2010). When given the opportunity to provide their children with more environmental education, urban parents are overwhelmingly in support of programs, like Outward Bound that give them the opportunity to do so (Bruyere et al., 2012).

Despite the fact that first-hand wildlife and wilderness opportunities are limited in urban environments, outreach programs can serve as sources of knowledge, behavior, and attitude change. A Japanese study found that urban residents became more confident in their wildlife knowledge and pro-wildlife behaviors with consistent outreach presence, such as wildlife management education programs (Sakurai, Jacobson, & Matsutsa, 2015). It was also important to have government support because people were more likely to participate in pro-wildlife activities if it was expected of them (Sakurai et al. 2015). Krasny & Tidball (2010) postulated that community efforts can also be particularly effective in generating pro-environmental action in cities. This Theory of Civic Ecology Education explains how attitudes towards positive environmental change are much stronger when communities work together to enact the change and share their experiences. Therefore, urban residents need to be empowered and emotionally invested for environmental education to be effective. Zoos are agencies of conservation education frequently situated near urban centers (Mony & Heimlich, 2008). For this reason, zoos

also need to understand how to reach their audiences by empowering them and facilitating their emotional investment as a part of the urban community.

## ENVIRONMENTAL EDUCATION FOR TEENAGED STUDENTS

Environmental education for youth has been well studied. In general, young people have been shown to consider environmental issues to be of high concern and those that possess more environmental knowledge exhibit more concern (Council for Environmental Education, 1994; Rosalino & Rosalino, 2012). More specifically, teenagers are aware of environmental issues and rank them of high concern (Haluza-Delay, 2001; Mammadova, 2017). However, they express uncertainty of their ability to act on these issues and do not necessarily connect them with their own lives, likely due to a lack of experience (Haluza-Delay, 2001; Mammadova, 2017). A Polish study found that upon entering university, students have overwhelmingly low environmental literacy (Tarabula-Fiortak, Gajus-Lankamer, Wojcik, & 2004). This may imply that schools are not making environmental education a priority. In the United States, education laws, such as No Child Left Behind, have made it difficult for all students to receive access to nature and to spend time outside, as the law places more emphasis on test performance (Strife & Downey, 2009; Rozelle & Mackenzie, 2011; Umholtz 2013). More recent legislation, such as the Every Student Succeeds Act, provides more opportunities for environmental education within the classroom; however, environmental education is not prioritized or encouraged under this law (Itza, 2017). For example, schools are allowed small amounts of funding to choose between environmental education programs and foreign language instruction (Itza, 2017).

Furthermore, the way schools provide environmental education is integral to how students relate to the environment. When schools do provide environmental education, it

is often classroom based and does not make experiential connections with the outside world (Tarabula-Fiortak et al., 2004; Mammadova, 2017; Umholtz, 2013). More specifically, students gain knowledge and awareness without attitude or behavior change (Woolman, 1996). When students are faced with knowledge of environmental issues and crises without being given a personal connection with the environment and the tools to be actively involved with nature, this results in cognitive dissonance (Umholtz, 2013). Students fearfully view the natural world as separate from their own, where apocalyptic disasters take place (Umholtz, 2013). This can also result in “ecophobia” in which people become overwhelmed and helpless with increased awareness of environmental degradation (Sobel, 2007). It can also be difficult for students to feel empowered and make positive connections with the natural world.

Alternatively, exposure to nature promotes positive environmental behavior among teenagers (Haluza-Delay, 2001; Umholtz, 2013). Programs like Inward Bound connects teenagers and young adults with the natural world by hosting retreats in natural settings (Wagner, 2016). These programs promote awareness of the natural world through compassion and awareness (Wagner, 2016). Exposure to nature also gives youth a stronger understanding of and connection with the environment (Mammadova, 2017). Students that visit zoos more often express more wildlife knowledge than those who do not (Rosalino & Rosalino, 2012). Students participating in wildlife related programs are likely to have increased interest in related careers and pursue them later in life (Sanford, 2014; Griffin, Glasscock, Schwertner, Atchley, & Tarpley, 2016). For example, students who participate in 4H programs, which facilitate concrete environmental education experiences, are reported to have significantly increased ecological knowledge, awareness



of environmental issues, and environmental stewardship (Vos, 2001; Culen & Mony, 2003). Students who only receive wildlife knowledge from school biology classes, as opposed to more direct experience express less concern and knowledge of those topics (Adams, Newgard, & Thomas, 1986).

Previous research done on teenager's responses to engaging in zoo education programs concluded that they frequently changed behaviors to be more environmentally positive (Bixler et al., 2014). In addition, teenagers frequently went beyond given expectations for their positions by talking about wildlife outside of the program and learning more about wildlife on their own (Bixler et al., 2014). A pilot study done on an internship for teenagers at a local zoo in the Czech Republic revealed high increase in knowledge and interpretive abilities as a result of the internship (Hajnys, 2010). Giving teenagers environmental education experiences outside of school is beneficial and can make a significant difference in their knowledge, attitude, and behavior towards the natural world.

## ENVIRONMENTAL EDUCATION PROGRAM EVALUATIONS

Program evaluations are systematic and in-depth analyses of programs. They are valuable for any environmental education program (Diamond, Luke, & Uttal, 2009). The evaluation identifies the mission of the program's organization and addresses whether the program matches that mission (Carlton-Hug & Hug, 2010; Matiassek & Luebke, 2014). It also identifies goals and objectives of the program and whether the program meets those goals and objectives (Carlton-Hug & Hug, 2010; Thomson & Hoffman, n.d.; Matiassek & Luebke, 2014). There are four types of evaluations based on when an evaluation takes place. Front-end evaluations are carried out during the research period to guide future

programming (Diamond et al., 2009). Formative evaluations are completed while a program is being created, but is still in development (Diamond et al., 2009). Remedial evaluations are done while a program is still new in order to troubleshoot issues (Diamond et al., 2009). Lastly, summative evaluations are done when a program has concluded and the evaluation may provide insight for future programming (Diamond et al., 2009).

There are many tools involved in evaluations. One valuable tool is the logic model. Basic logic models graphically summarize inputs, outputs, and outcomes of a program (Vos, 2001; Diamond et al., 2009, Fig 2.3). Other tools useful for evaluations are research instruments to gather information on program participants, such as questionnaires, interviews, and observations (Stokking, van Aert, Meijberg, & Kaskens, 1999; Diamond et al., 2009; Kudryavtsev & Krasny; 2014). In the context of environmental educational programming, these instruments are designed to determine change in environmental knowledge, as well as, awareness and attitude and behavior change (Stern, Powell, & Hill, 2014). However, it is difficult to identify if the programs in question is responsible for changes in awareness, attitude, and behavior towards the environment, or whether external factors have played a role (Stern, et al., 2014).

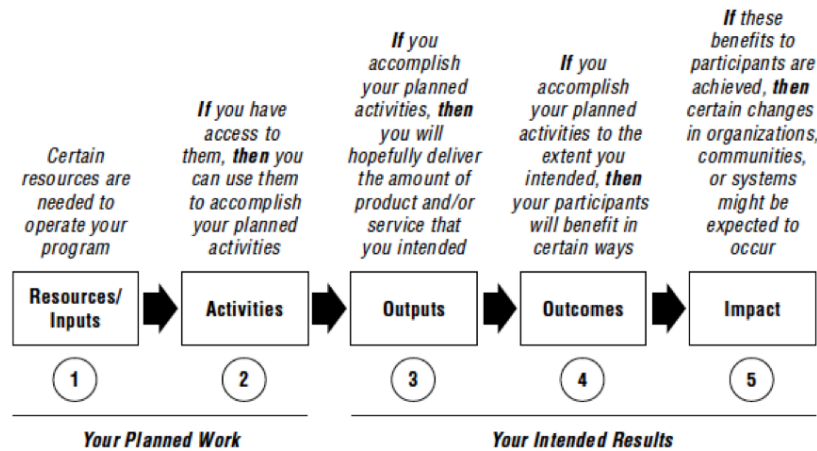


Figure 2.3: Example of a basic logic model. Reprinted from “Logic Model Development Guide: Using Logic Models to Bring Together Planning, Evaluation, And Action” in *W.K. Kellogg Foundation Development Guide*. Retrieved March 16, 2018, from <https://www.wkkf.org/resource-directory/resource/2006/02/wk-kellogg-foundation-logic-model-development-guide>. Copyright 1998 by the W. K. Kellogg Foundation. Reprinted with permission.

Program evaluations are thought to be most effective when they are done starting at inception and planning (De White & Jacobson, 1994). However, this is often difficult due to timing and financial constraints (De White & Jacobson, 1994). In general, organizations are hesitant to allow evaluations for many reasons, e.g., financial limitations (De White & Jacobson, 1994; Matiassek & Leubke, 2014). Another constraint to robust evaluations is environmental education programs often do not have clearly defined goals and objectives (Carlton-Hug & Hug, 2010). Program administrators may also be fearful of negative evaluations and lastly, they not be trained in conducting program evaluations (Carlton-Hug & Hug, 2010; Matiassek & Luebke, 2014). Despite costs and unknown outcomes, evaluations have the potential to make environmental organizations and their programs stronger (Matiassek & Luebke, 2014, Thomson & Hoffman, n.d.). Zoos participating in program evaluations have reported better decision-making abilities,

program organization, and better communication (Matiasek and Luebke, 2014) plus it is a requirement of AZA accreditation (“Accreditation Basics”, 2018).

## EXPERIENTIAL LEARNING THROUGH WORKING EXPERIENCES

Giving youth direct experience also has significant impacts on their professional development. University faculty have noticed that upon entering college, students not only lack environmental literacy (Tarabula- Fiertak et al., 2004) and personal experiences with nature (Mammadova, 2017), but they also lack skills necessary for environmental careers (Kroll, 2007). In order to ensure new biologists are properly trained for careers, such as those in wildlife science, they should pursue professional internships (Kroll, 2007). As was previously stated, professional internships provide a variety of benefits and opportunities for students interested in environmental careers (Hajnys, 2010). For example, having an inspiring mentor present during a first working experience is particularly beneficial for motivating young people to continue in their fields (Hepper, 2015).

Having experience teaching environmental topics in an informal setting gives students confidence in those fields later (Ferry, 1995). Students interested in wildlife careers do not initially perceive teaching ability as a necessary skill for their futures, but many do so after being introduced to environmental education (Stevenson & Peterson, 2015). Thus, environmental education experiences can be beneficial for any young person interested in wildlife-related careers.

There are many reasons youth choose to participate in professional programs. In general, teenagers are likely to seek out introductory working experiences, such as internships, when they are unsure of their career goals and want to strengthen their

understanding of a specific field (Lechner, Tomasik, & Silbereisen, 2016). Teenagers who participate in extracurricular programs do so to gain job experience and new skills, such as conflict resolution, which qualifies these teenagers for more job opportunities in the future (Perkins, Borden, Villarruel, Carlton-Hug, Stone, & Keith, 2007). Correspondingly, many teenagers who participate in zoo education programs do so to gain job experience.

Previous research indicates teenagers also seek out these experiences more likely because of their likes and dislikes more than any other factor (Volodina & Nagy, 2016).

Low levels of employment of minority individuals have long been reported in STEM fields, and especially in wildlife and conservation professions. Wiggins & Tingley (2015) documented that diversity has increased in recent somewhat decades; however African American, Hispanic, and indigenous ethnicities are still rarely represented. They say much of this is attributable to available opportunities, both professional and educational. Programs have been created to foster more inclusion of underrepresented groups in conservation careers through career and college readiness workshops and mentorships. The Bridging the Gap program, created by Wildlife Conservation Society (WCS), which oversees four zoos and one aquarium in New York City, is one example. Programs like these allow more young people access to STEM opportunities and tools they need to pursue related careers.

## CONCLUSION

The ZooGuides program represents an appropriate program to study in the field of zoo education. Zoo Guides do not necessarily enter the program with any interest in wildlife and education. However, they are given knowledge about wildlife, zoos, and interpretive methods through training, and then experience educating guests about wildlife

at the zoo. Literature suggests that because Zoo Guides are an urban demographic they are not expected to have had direct experience with wildlife, and therefore will have less wildlife knowledge and less of a pro-wildlife attitude and behavior (Baker, 2000; Olive, 2014). Receiving training about these topics, and even more so direct experience, should have a significant impact on the Zoo Guides' relationship with wildlife. Having a professional immersive experience increases teenager's knowledge and skills (Ferry, 1995; Hajnys, 2010; Hepper, 2015). The direct experiences they gain should translate knowledge into attitude and behavior, according to Kolb's (1984) Experiential Learning Theory. Whether Zoo Guides will become better educators depends on what they have learned during training and how they use their experience on exhibit to shape how they approach guests and engage them.

In order to effectively educate guests, Zoo Guides need to understand guests' motivations (Marino et al., 2010; Packer & Ballantyne, 2010; Roe & McConney, 2015) and background knowledge (Packer & Ballantyne, 2010), as well as engage in provocative conversations (Marcussen, 2002; Idema & Patrick, 2016). This study will use recommended evaluation methods, such as survey instruments (Diamond, et al., 2009) to determine whether the ZooGuides program is effective through a remedial evaluation. However, the Rosamond Gifford Zoo does not currently have clearly defined goals and objectives for the ZooGuides program.

## CHAPTER 3: METHODS

### INTRODUCTION

This chapter describes the study circumstances, including the study setting and participants. A mixed method approach was used for data collection and analysis. Data collection is outlined according to the study's five research questions, followed by data analysis.

### SETTING

The Rosamond Gifford Zoo is managed by Onondaga County Parks ("About the Zoo", n.d). It is located in the City of Syracuse, Onondaga County, NY, on the southern tip of Onondaga Lake ("About Syracuse", 2009). The city's population was 143,378 in 2016 ("Population and Housing Unit Estimates", 2017). The area has a continental climate, with cold snowy winters, and warm summers ("About Syracuse", 2009, Fig. 3.1). The Rosamond Gifford Zoo was founded in 1914 and is accredited by the Association of Zoos and Aquariums (AZA). It encompasses 174,015 m<sup>2</sup> with 700 individual animals of 233 different species, including large, popular mammals, such as African lions Asian elephants, and Amur tigers ("Animals Overview", n.d., Fig. 3.2). The zoo maintains the following educational programs:

- Zoo to You, in which zoo personnel do outreach with the zoo's education animals, e.g., visits to schools, libraries, and day care centers ("Zoo to You", n.d.)
- Summer and seasonal camps ("Summer Camp", n.d.; "Seasonal Camps", n.d.)
- Edventure Academy, which includes age-specific animal programs onsite
- Onsite educational programs for school groups and adults ("Adult Programs", n.d.; "Onsite Educational Programs at the Rosamond Gifford Zoo", n.d.)

The zoo also supports volunteering for individuals age 10 and up, internships, and job shadowing (“Volunteer at the Zoo”, n.d.; “Employment”, n.d.).



Figure 3 1: Map of Rosamond Gifford Zoo in the Greater Syracuse Area. Google. (n.d.). [Google Maps location of Rosamond Gifford Zoo]. Retrieved February 20, 2018, from <https://www.google.com/maps/place/Rosamond+Gifford+Zoo/@43.0437991,-76.1827019,17z/data=!3m1!4b1!4m5!3m4!1s0x89d9f3e06d542b07:0xbaf0074dfa26812!8m2!3d43.0437991!4d-76.1805132>.



Figure 3 2: Map of Rosamond Gifford Zoo Showing the General layout of animal exhibits and buildings. Reprinted from “Zoo Map” in Rosamond Gifford Zoo. Retrieved February 20, 2018, from <http://www.rosamondgiffordzoo.org/zoo-map>. Copyright n.d. by the Rosamond Gifford Zoo. Reprinted with permission.



## STUDY PARTICIPANTS

There were several participants involved in this ZooGuides program study. The Rosamond Gifford Zoo's Director of Education was not interviewed during this study. While he was involved with the Zoo Guides' initial training, he did not primarily oversee them during the working season. He did allow access to the zoo, the program participants, and the distribution of study instruments. Two supervisors, who are not full-time staff at the Rosamond Gifford Zoo year-round, were both interviewed. These supervisors work solely within the ZooGuides program and were present for the entire training period and the working season, directly overseeing and interacting with Zoo Guides. Both of these supervisors work during the school year as teachers and had experience with teenagers. One supervisor had been with the program since it began and the other began her first year in 2017. There were 16 high school students ages 16 and older hired as Zoo Guides for the first time during the 2017 program. They were given surveys and journals. There were four high school students ages 16 and older hired for the second time during the 2017 program. They were given surveys and interviewed. Lastly, zoo guests were also observed and interviewed in this study.

## ZOOGUIDES PROGRAM STRUCTURE

The Rosamond Gifford Zoo worked in collaboration with employment and social services organizations, CNY Works and the Hillside Work Scholarship, to create an employment program for underrepresented lower income youth ages 16 and up in local high schools. The program was created in 2009, making the 2017 summer its eighth year. This was a selective opportunity, paying minimum wage. Zoo Guides were not volunteers;

however, they received the same training as the zoo's high school volunteers, and similarly served as informal educators interacting with the public. The opportunity was advertised directly to five Syracuse City School District (SCSD) schools and one charter school located within Syracuse.

Applicants were first screened by CNY Works for suitability and responsibility. Individuals who passed the initial screening were then interviewed with Rosamond Gifford Zoo's education department. Four students from the previous year's program were recruited to return. By mid-March, 16 new students were selected to participate, for a total of 20 Zoo Guides. From March through May, the Zoo Guides received 35 hours of training, including biological concepts that would review knowledge from the New York State Regents Living Environment course (which all students in the SCSD must take), zoo history, zoo information including animal management and training, the role of modern zoos, interpretive techniques, and practice talking with peers as co-workers and the public about the biology and ecology of zoo animals. From May until the end of August, Zoo Guides were out on exhibit, usually stationed at carts with biofacts and activities. There, Zoo Guides interacted with guests. Zoo Guides also assisted with three zoo events during the working season including Party for the Planet, World Ocean's Day, and Asian Elephant Extravaganza.

Various training sessions were observed throughout the schedule from March 28 – May 2, 2017 to better understand how guides would be trained for their jobs. These observations also allowed Zoo Guides to become comfortable with the presence of a researcher during the 2017 program. Because all Zoo Guides were attending school during

this period of time, training sessions were held in the evening, weekends, and during school breaks.

## DATA COLLECTION

*Research Question 1: Do Zoo Guides increase their biological knowledge as a result of the program?*

Quantitative data addressing this research question was taken from pre-test, post-training test, and post-program test surveys. All guides who chose to participate in the study were given a training pre-test (Appendix A) on the same day before formal program training began. Eight questions consisting of short answers, multiple choice, and tables were given on biological knowledge. These questions were developed based on concepts learned during training. There were also questions concerning demographic data (age, gender, ethnicity, and neighborhood type) at the end of the pre-test. The working schedule began on May 6 with half of the guides working on Saturday and the other half on Sunday until the school year ended. The 16 new guides were given a post-training test (Appendix B), on May 6 or May 7. The biological knowledge questions on this survey consisted of a subset of four questions from the pre-test in a different order. The last week of the working schedule began on August 14 and ended with the zoo event Elephant Extravaganza on August 19. Depending on the day each guide was scheduled to work, all 20 guides were given a post-program test (Appendix C) sometime during this week. The survey consisted of a subset of four biological knowledge questions from the pre-test that were different from the post-training test. This was done in order to discourage guides from learning from the biological knowledge questions on the pre-test and post-training test. All three surveys were given self-reported codes consisting of the participant's birth

date and the first three letters of his or her last name. This allowed all the surveys to remain confidential and still be linked to individuals. The pre-test was given to guides on the first day of training to quantitatively assess their development before they received training and worked onsite. The post-training test was given to guides on the first weekend of the working season to quantitatively assess their development after training, but before working onsite. The post-program test was given to guides during the last week of the working season to quantitatively assess their development after training and working onsite. Unfortunately, one guide was not in attendance during the last week of the 2017 program when the post-program test was given out. For this reason, this individual was omitted from all survey results.

Qualitative data addressing this research question was taken from journal entries. A set of two journal questions (Appendix D) was given to new guides each month of the working season: May, June, July, and August. Each journal posed two open-ended questions. The first journal was designed for the guides' first impressions. The second journal was designed to gather the guides' thoughts after a little experience. The third journal was designed to gather the guides' thoughts after gaining more experience. The fourth journal was designed to gather summative experiences and overall thoughts on the program. Responses to journal questions from May: "How would you describe your first day working as a guide?", June: "Which station is your favorite to work from? Why?", and July: "Describe a moment when you felt you did your best as a guide?" addressed the study's research question on the guides' biological knowledge.

*Research Question 2: Do Zoo Guides increase their interest in wildlife and wildlife conservation as a result of the program?*

The quantitative data addressing this research question was taken from the surveys. There were two checklist questions on interest in wildlife conservation on the pre-test. The first consisted of a checklist of activities both positively and negatively related to wildlife and broader environmental conservation done in the past year. The second was a checklist of diverse causes the participant might donate money to, if given the opportunity. This question sought to understand participants' interest in wildlife and the importance of wildlife conservation. These questions were adapted from Bixler et al. (2014), Olive (2014), and Adams et al. (2017). On the post-training test the wildlife interest activities checklist asked about activities done in the last five weeks, during the training period. On the post-program test the wildlife interest activity checklist asked about activities completed in the last four months, during the working season. The checklist question listing various causes remained the same on each survey.

The qualitative data addressing this research question was taken from journals and returning Zoo Guide interviews. The journal questions yielding responses pertaining to wildlife and wildlife conservation interest were from May: "How would you describe your first day working as a guide", June: "Which station is your favorite to work from? Why?", and August: "Do you feel like you've made a difference as a guide? Why or why not?", "Would you return as a guide next year? Why or why not?".

The four returning Zoo Guides were interviewed with a set of four open-ended questions (Appendix E). These questions were designed to gain general information on how the program has impacted their lives and what they gained from the program. These

interviews were given once for each returning Zoo Guide. Three of the interviews were completed on July 21 and one was completed on July 25. Interviews were digitally recorded and lasted 3–5 min. per Zoo Guide, so as not to interfere with the work schedule. These interviews were conducted one-on-one in a private room. The interview questions yielded responses pertaining to wildlife and wildlife conservation interest, for example, “What was your experience your first year as a guide?” and “How has your life changed as a result of being a guide?”.

*Research Question 3: Do Zoo Guides increase their knowledge and interest in related careers as a byproduct of being in the program?*

Quantitative data addressing this research question was taken from the surveys. One question asked guides to report three careers they are interested in pursuing. This question remained the same on each survey. Qualitative data addressing this research question was taken from journals and returning guide interviews. The journal questions yielding relevant responses were from May: “How would you describe your first day working as a guide?”, June: “Which station is your favorite to work from? Why?”, July: Describe a moment when you felt you did your best as a guide”, and August: “Would you return as a guide next year? Why or why not?”. All of the returning guide interview questions yielded responses relevant to related career interest.

*Research Question 4: Do Zoo Guides increase their ability to educate guests in an engaging and effective way?*

Quantitative data addressing this research question was taken from surveys, guest observations, and guest interviews. A single question asked guides to identify their confidence in their ability to educate guests as “Not Confident”, “Low Confidence”,

“Somewhat confident”, and “Very Confident.” This question remained the same on each survey. On April 29, the zoo held its Party for the Planet event. During this event, guides were stationed at tables throughout the zoo to interact with guests. Additionally, many of the guides participated in activities such as face painting, and did not educate guests, so observational data taken at this event could not be analyzed. Observations taken at this event were used as a pilot study to determine how guests might interact with Zoo Guides during their working schedule in the summer. Guest behaviors observed during guests’ interactions with guides were noted and the most frequent behaviors were used as indications of engagement during formal observations. This event also served as practice for the guides, as they had not interacted with the public previously.

During all four months of the working season, each month 30 guests were observed in interactions with Zoo Guides. Guests were then interviewed immediately afterwards (Appendix F) while wearing a ZooGuide uniform. Thirty participants were observed and interviewed in order to have a statistically adequate population. These observations and interviews were conducted primarily on Fridays, when all ZooGuides were required to work, so as to avoid bias. During May, these interviews and observations were done on weekends because of the school year. In August, interviews were completed each day of the last week of the working season because of zoo event scheduling. Interviews consisted of two questions about the ZooGuides’ confidence and about what guests learned.

Qualitative data addressing this research question was taken from journals and supervisor interviews. The journal questions yielding relevant responses were from May: “How would you describe your first day working as a guide?” and “Was there ever a

situation in which you didn't know how to answer a question? How did you handle this question?", June: "Which station is your favorite to work from? Why?" and "Describe a part (or parts) of being a zoo guide you could improve on," July: "Describe a moment when you felt you did your best as a guide," and August: "Do you feel like you've made a difference? Why or why not?". Every month during the working season (May, June, July, and August), the two zoo guide supervisors were interviewed (Appendix G) on the zoo guides' ability to effectively educate and engage guests and work together. This question remained the same each month. These interviews were recorded by hand.

*Research Question 5: Do Zoo Guides gain relevant workplace skills as a result of the program?*

Quantitative data addressing this research question was taken from surveys. There were five Likert scale questions on relevant workplace skills on the pre-test. A six-point scale was used so Zoo Guides could not choose a middle value to rank their skills. These questions were adapted from Askue et al. (2009). These questions provided insight into the Zoo Guides' comfort in working with other people, comfort in talking about conservation, comfort in talking to superiors, confidence in their ability to talk to groups of people, and comfort in answering zoo related questions. The post-training and post-program tests posed an additional Likert scale question on how training has prepared them to interact with guests. The post-program test posed one more additional Likert scale question on how skills gained as a Zoo Guide will better prepare them for jobs in the future.

Qualitative data addressing this research question was taken from journals, returning Zoo Guide interviews, and supervisor interviews. Journals yielding relevant



responses were from May: “Was there ever a situation in which you didn’t know how to answer a question? How did you handle this question?”, June: “Describe a part (or parts) of being a zoo guide you could improve on,” July: “Have you ever encountered any conflicts with your fellow guides or supervisors? How did you handle this conflict?” and August: “Do you feel like you’ve made a difference? Why or why not?” and “Would you return as a guide next year? Why or why not?”. All of the returning guide interviews and supervisor interviews yielded responses relevant to workplace skills gained throughout the program.

## DATA ANALYSIS

Using a rubric (Appendix H), values were assigned to the biological knowledge questions from the pre-test, post-training test, and post-program test. Question values ranged from 2–10 points. Points were awarded to key concepts and terms, according to what Zoo Guides learned during training. Descriptive statistics of mean and standard deviation were calculated for the collective responses to each component of the survey: biological knowledge, attitude and interest, careers, and job confidence. Individual parts of each survey were compared for significant differences using a paired t-test at  $\alpha = 0.10$ . This critical value was used because higher critical values are used in educational program evaluations (Julnes & Moore, 1989; Stokking, et al., 1999; Stevenson & Peterson, 2015). A paired t-test was used so each survey could be compared with each other, as the same individuals were given the same questions on each survey. Percentages of correct responses for biological knowledge questions across respondents were compared for differences among the three tests.

Responses from returning guides for the pre-test and the post-training test were not statistically analyzed, but used to provide qualitative inferences on retention and future research. According to survey responses, number of environmentally positive activities, amount of money donated to biodiversity conservation, and scale given to each workplace skill were also statistically compared using a paired t-test. Career responses were only analyzed with descriptive statistics because they did not provide further useful statistical information. Zoo Guides' confidence in their ability to educate guests was statistically analyzed using a chi-square distribution test ( $\alpha=0.10$ ), as it was categorical data.

Guest learning statements from interviews were coded according to the level of learning, from low to high (Appendix I). These interviews were coded based on emergent statements from responses (Table 3.1). All qualitative data coded with emergent statements was also coded by a second coder to prevent coder bias. Numbers of learning categories and guest opinions of Zoo Guide confidence and indications of learning were summed for each month. The distribution of learning categories, agreement of Zoo Guide confidence, and agreement of learning were compared with chi square distribution tests ( $\alpha = 0.10$ ). Guest observations were coded by enjoyment indicators, such as smiling, laughing, eye contact, and conversation engagement. These indicators were meta-coded according to levels of engagement, from disinterest to high interest (Appendix J, an example of this coding is found in Table 3.2):

Table 3.1: Example of guest interview coding. Guests' interview responses were coded by type of information. This information qualified the response as an indication "Basic", "Intermediate", or "Advanced" learning.

<b>Learning Category</b>	<b>Qualifier</b>	<b>Example</b>
<b>Basic</b>		
	Animal's position	"Where the wolves are"
	Animal's birthday	"It's the elephant's birthday"
	Number of animals in enclosure	"There are two wolves"
<b>Intermediate</b>		
	Animal's size	"How large elephant skulls are"
	Anatomical information	"The red pandas use their tails to keep them warm"
	Behavioral information	"They use their front paw to grab stuff"
	Natural history	"The red panda isn't actually related to pandas"
	First level conservation	"Some tiger parts are used for medicine"
<b>Advanced</b>		
	Higher level conservation	"Tiger parts are used for medicine, which is why people hunt them"
	Higher level behavior	"It's difficult to find the tigers because they hide to hunt in the wild"

Table 3.2: Example of guest observation coding. Guests were observed during their interactions with guests. Their behaviors were recorded and coded as indications of engagement as "Disinterest", "Low Interest", "Medium Interest", and "High Interest".

<b>Engagement Category</b>	<b>Example</b>
Disinterest	Looking away
Low Interest	Touching biofact
Medium Interest	Smiling
High Interest	Engaging others

Similarly to guest interviews, percentages of engagement categories were calculated and compared between each month with a chi-square distribution test ( $\alpha = 0.10$ ). Journal responses were coded by emergent key themes and phrases, such as emotions for each month's questions (Appendix K, Table 3.3).

Table 3.3: Example of new Zoo Guide journal coding from May journals. Statements within responses to each journal question were analyzed. These statements were coded according to emergent key themes and phrases.

<b>How would you describe your first day working as a guide?</b>	
<b>Key Theme or Phrase</b>	<b>Example</b>
Fear	"My experience on my first day as a zoo guide was very scary"
Joy/excitement	"Exciting, fun, curious"
Confusion	"I didn't know what to expect, things was moving fast"
<b>Was there ever a situation in which you didn't know how to answer a question? How did you handle this question?</b>	
<b>Key Theme or Phrase</b>	<b>Example</b>
I don't know, but I'll find out	"Yes, I told them I didn't know and would ask them when I get the answer"
No	"No"
I don't know	"Yes, some visitors asked about a show time and I didn't know so I asked Pam or Heidi. I simply said 'I don't know'"

Similarly to new Zoo Guide journals, interviews from returning Zoo Guides were coded by emergent key themes and phrases (Appendix L, Table 3.4).

Table 3.4: Example of returning Zoo Guide interview coding. Statements within responses to each interview question were analyzed. These statements were coded according to emergent key themes and phrases.

<b>Why did you decide to return as a guide?</b>	
<b>Key Theme or Phrase</b>	<b>Example</b>
Fun	"We've had fun in the previous years, so I decided to try it out"
Positive Experience	"It was a good experience and I love it here"
Interacting with people	"I just like meeting the people here"
Leadership	"I wanted to have a senior position on something"

Supervisor interviews from May were coded into emergent indications of good, bad, and adequate levels of interactions with guests, interactions with each other, skills, and attitude (Appendix M, Table 3.5).

Table 3.5: Example of supervisor interview coding with supervisor one from May. Statements contained within interview responses pertaining to Zoo Guides' "Interaction With Guests", "Interaction With Each Other", "Skills", and "Attitude" were analyzed based on emergent indications of "Good", "Bad", or "Adequate" level.

<b>May Supervisor 1</b>		
<b>Category</b>	<b>Level</b>	<b>Example</b>
Interaction With Guests	Good	"They're interacting well with the public"
Interaction With Each other	Good	"The group is bonding well"
Skills	Bad	"They don't take the first step. It will take time as they don't feel as confident"
Attitude	N/A	N/A

Supervisor interviews from June, July, and August were coded into emergent indications of better, similar, or worse levels of the same categories in comparison with May (Appendix N, Table 3.6).

Table 3.6: Example of supervisor interview coding with supervisor one from June. Statements contained within interview responses pertaining to Zoo Guides' "Interaction With Guests", "Interaction With Each Other", "Skills", and "Attitude" were analyzed based on emergent indications of "Better", "Worse", or "Same" level. These levels were based on a comparison with May's responses.

<b>June Supervisor 1</b>		
<b>Category</b>	<b>Level</b>	<b>Example</b>
Interaction With Guests	Some better, some same	"Some have gotten right in. Some are still shy and will let people walk by"
Interaction With Each other	Same	"Having seniors is great. That's where the Juniors get most of their information from"
Skills	Better	"They're much better than how they started off"
Attitude	Better	"All have grown in some way"

These journals and interviews were not statistically analyzed. A brief evaluation report was also created based on the results of this study and provided to the Rosamond Gifford Zoo. This was done in hopes that the zoo can use this study's instruments for future evaluations and to provide insight on the continuation of the ZooGuides program.

## CHAPTER 4: RESULTS

### OVERVIEW

This chapter begins with self-reported demographic information for the 2017 Zoo Guides. Results are organized by the five research questions according to quantitative and qualitative evidence.

### DEMOGRAPHICS

On the pre-test survey, individuals were asked to identify their gender, age, ethnicity, and neighborhood type. Results of Zoo Guides' responses are given as a percentage out of the 20 Zoo Guides in the 2017 program (Table 4.1).

Table 4.1: Self- identified Zoo Guide (n=20) demographics. All 20 Zoo Guides were asked to identify their gender, age, ethnicity, and neighborhood type. Tallied responses are given as percentages.

Demographic Category	Percentage
<b>Gender</b>	
Male	50%
Female	50%
<b>Age</b>	
16	30%
17	35%
18	30%
19	5%
<b>Ethnicity</b>	
Black/African American	50%
Latino/Hispanic	30%
White/Caucasian	5%
More than one	10%
Other	5%
<b>Neighborhood Type</b>	
Urban	75%
Suburban	20%
Rural	5%

## RESEARCH QUESTION 1: DO ZOO GUIDES INCREASE THEIR BIOLOGICAL KNOWLEDGE AS A RESULT OF THE PROGRAM?

### *Quantitative Evidence*

Biological knowledge percentages for the pre-test, post-training test, and the post-program test were below 50% correct, indicating the Zoo Guides lacked biological knowledge (Fig. 4.1, Table 4.2). Despite the fact Zoo Guides had low mean percentages of correctness on both the post-training test ( $30.07\% \pm 8.62$ ) and the post-program test ( $33.86\% \pm 12.40$ ), the mean increased from the pre-test ( $24.32\% \pm 9.20$ ) to the post-training test. The mean increased even more on the post-program test. These increases in mean percentage were significant ( $df = 14, t > 1.35, p < 0.10$ ) each time. Thus, the Zoo Guides' biological knowledge increased significantly after five weeks of training and increased significantly even more after interacting with guests for four months.

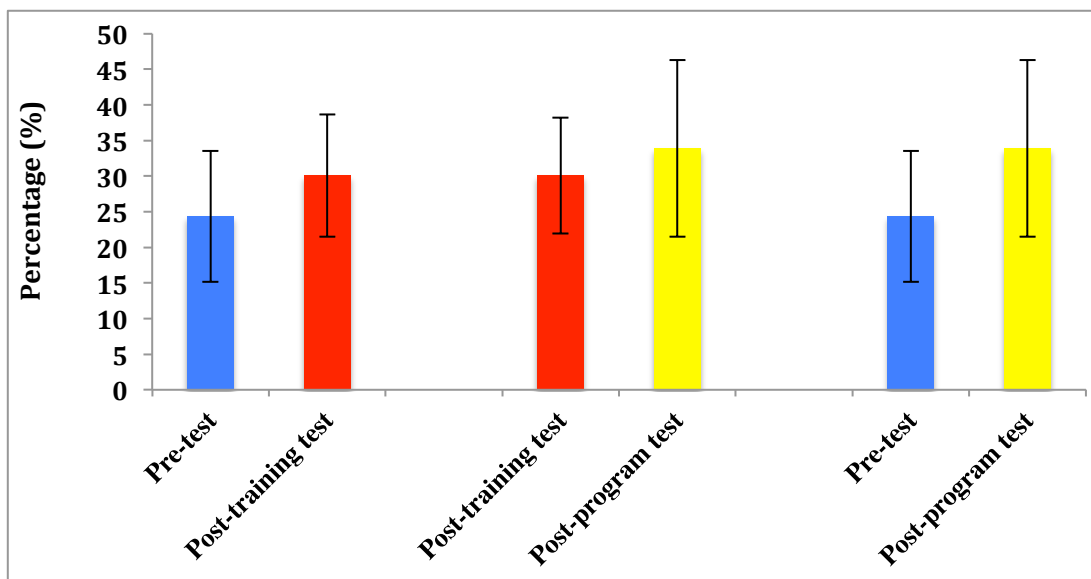


Figure 4.1: Mean ( $\pm$  SD) percentages of correct biological knowledge responses compared between the pre-test (blue) and the post-training test (red), between the post-training test (red) and the post-program test (yellow), and between the pre-test (blue) and the post-program test (yellow).



Table 4.2: Paired t-test results for comparisons of mean ( $\pm$  SD) percentages of biological knowledge correctness for each survey.

Survey	Mean $\pm$ SD Percentage	P-value (T-value)	
		Comparison With Post-training Test	Comparison With Post-program Test
<b>Pre-test</b>	24.35 $\pm$ 9.2	***0.00 (6.27)	***0.00 (4.18)
<b>Post-training Test</b>	30.07 $\pm$ 8.62	N/A	**0.04 (1.83)
<b>Post-program Test</b>	33.86 $\pm$ 12.4	**0.04 (1.83)	N/A

$df = 14, n = 15, *p < 0.10, **p < 0.05, ***p < 0.01$

Zoo Guides were expected to increase their biological knowledge as a result of the program. In addition, working on exhibit was expected to have a bigger impact on knowledge than training. Both of these expectations were fulfilled by the quantitative results.

### *Qualitative Evidence*

The first question on the first journal, given in May, asked Zoo Guides how they felt their first day working as a Zoo Guide (Table 4.10). Some Zoo Guides (35.30%) were confident in themselves and were excited to be out on exhibit:

“Very fun! There were a lot of people here, and they were very interested in the facts I told them about the animals.”

However, many Zoo Guides also expressed fear (52.90%) and confusion (11.80%). These guides expressed the fear that they would give out wrong information to guests and relied on remembering the information they had learned during training:

“It was scary because I thought that I would give false information out or not know anything at all.”

“I tried my hardest to remember the information of the animal I was doing.”

After interacting with a few guests, Zoo Guides expressed more confidence in themselves and their own knowledge:

“I was scared yes, but got over it.”

Table 4.3: New Zoo Guide journal responses for May. Key themes and phrases coded from responses are given under their corresponding journal question. Each key theme or phrase is followed by the percentage of tallied responses out of a total of 15.

<b>How would you describe your first day working as a guide?</b>	<b>Was there ever a situation in which you didn't know how to answer a question? How did you handle this question?</b>
Fear (52.90%)	I don't know, but I'll find out (66.70%)
Joy/excitement (35.30%)	No (6.70%)
Confusion (11.80%)	I don't know (26.70%)

The first question on the second journal, given in June, asked which station was the Zoo Guides' favorite and why (Table 4.21). The reasons Zoo Guides picked stations such as tiger (42.9%) or elephant (21.4%) was primarily because of the information they gave to guests there. Zoo Guides expressed their ability to convey the most compelling information to guests and that these were the stations where they knew the most about the animal subject:

“Tiger because a lot of people like the tiger and I know facts about this animal the most.”

“I like to work at the tiger or lion station because that's where I know the most information for.”

Table 4.4: New Zoo Guide journal responses for June. Key themes and phrases coded from responses are given under their corresponding journal question. Each animal listed and then key theme or phrase is followed by the percentage of tallied responses out of a total of 15.

<b>Which station is your favorite to work from? Why?</b>		<b>Describe a part (or parts) of being a zoo guide you could improve on.</b>	
Tiger	(42.90%)	Talking more	(28.60%)
Elephant	(21.40%)	Engaging	(28.60%)
Bear	(14.30%)	Learn	(21.40%)
Lion	(21.40%)	Shyness	(21.40%)
Cool information	(6.70%)		
Surprise people	(20.0%)		
Adoration	(13.30%)		
Exciting	(13.30%)		
Know	(33.30%)		
Interesting	(13.30%)		

The first question on the third journal, given in July, asked the Zoo Guides to describe a moment when they felt they did their best as Zoo Guides (Table 4.22). There were moments mentioned when the guides were proud of themselves for giving plenty of information to guests (11.80%). Zoo Guides mentioned both the amount of information, as well as the accuracy (47.10%):

“The best moment that I did best at was working with the snakes, I had a lot of information about them and could answer questions I had the answers to.”

“The time I felt I did my best as a guide was when I was at snow leopard and there was a big group of people, I gave out accurate information and the guests learned new things.”

Table 4.5: New Zoo Guide journal responses for July. Key themes and phrases coded from responses are given under their corresponding journal question. Each key theme or phrase is followed by the percentage of tallied responses out of a total of 15.

<b>Describe a moment when you felt you did your best as a guide</b>		<b>Have you ever encountered any conflicts with your fellow guides or supervisors? How did you handle this conflict?</b>	
Alone	(11.80%)	No	(71.40%)
Information	(47.10%)	Yes, but forgot	(7.10%)
A lot of people	(11.80%)	Physical altercation	(7.10%)
Thank	(23.50%)	Talking	(14.30%)
First time	(5.90%)		

Zoo Guides put emphasis on the information they knew and were able to give to guests in their journal responses. Some Zoo Guides were confident in themselves on the first day working. However, for many of the Zoo Guides that were scared it was partially due to their fear of forgetting information they had learned during the five weeks of training. After a month of working on exhibit, Zoo Guides were able to find their strengths in knowledge about the animals. After two months, the Zoo Guides were able to give out information in a way that led them to occasionally receive compliments from the public. They understood information about the animals on exhibit well. Zoo Guides were expected to increase their biological knowledge as a result of the program. In addition, working on exhibit was expected to have a bigger impact on knowledge than training. Both of these expectations were fulfilled by the qualitative results.

## RESEARCH QUESTION 2: DO ZOO GUIDES INCREASE THEIR INTEREST IN WILDLIFE AND WILDLIFE CONSERVATION AS A RESULT OF THE PROGRAM?

### *Quantitative Evidence*

When asked about which wildlife related activities the Zoo Guides had done, the mean did increase significantly from the pre-test ( $6.29 \pm 1.80$ ) to the post-training test ( $7.67 \pm 3.11$ ) ( $df = 14$ ,  $t = 4.3$ ,  $p = 0.00$ ). It is notable that the pre-test inquired about activities done within the past year, while the post-training test only inquired about a timeframe of five weeks (the training period). The post-program test mean ( $7.60 \pm 2.50$ ) was also higher than the pre-test ( $df = 14$ ,  $t = 5.28$ ,  $p = 0.00$ ). However, the post-program test mean was lower than the post-training test mean, though this difference was not significant ( $df = 14$ ,  $t = 0.27$ ,  $p = 0.40$ ), and the timeframe for activities on the post-program test (four months, the working season) was shorter than that of the post-training test (Fig.4.2, Table 4.3). Zoo Guides had done more pro-wildlife activities after five weeks of training, but they did not do even more activities after four months of working on exhibit. Twelve pro-environmental activities were listed, so Zoo Guides reported more than half of these activities on each test.

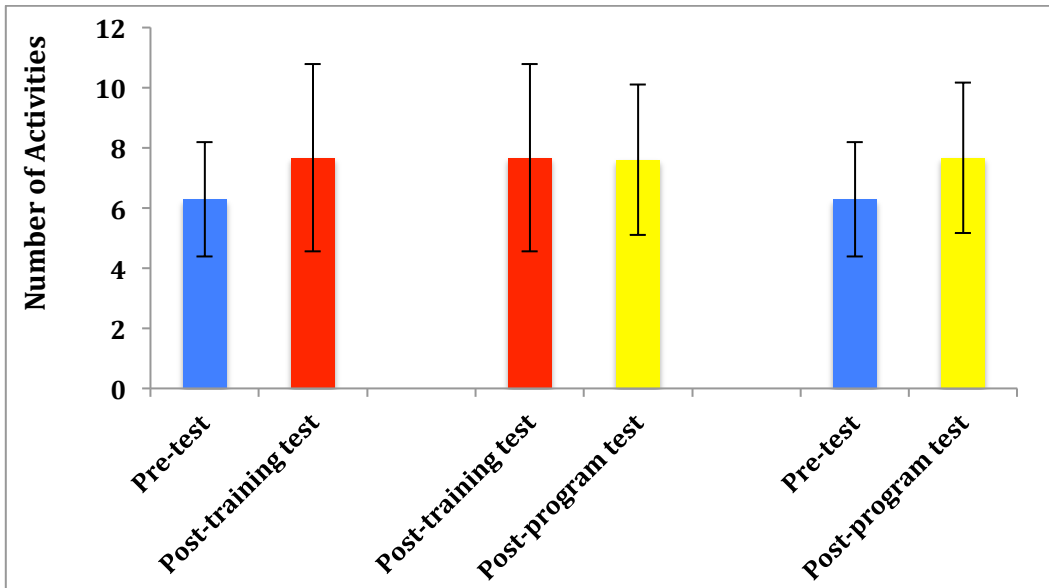


Figure 4.2: Mean ( $\pm$  SD) wildlife related activities checked off on surveys compared between the pre-test (blue) and the post-training test (red), between the post-training test (red) and the post-program test (yellow), and between the pre-test (blue) and the post-program test (yellow).

Table 4.6: Matched pair t-test results for interest in wildlife and wildlife conservation through wildlife related activities between three surveys.

Survey	Mean $\pm$ SD	P-value (T-value)	
		Comparison With Post-training test	Comparison With Post-program test
Pre-test	6.29 $\pm$ 1.90	***0.00 (4.26)	***0.00 (5.28)
Post-training test	7.67 $\pm$ 3.11	N/A	0.40 (0.27)
Post-program test	7.60 $\pm$ 2.50	0.40 (0.27)	N/A

$n = 15$ ,  $df = 14$ ,  $*p < 0.1$ ,  $**p < 0.05$ ,  $***p < 0.01$

When asked to distribute hypothetical \$100 to causes, Zoo Guides donated a higher mean number of dollars to biodiversity loss on the post-training test (\$17  $\pm$  7.51) than on the pre-test (\$11  $\pm$  10.10). This increase was significant ( $df = 14$ ,  $t = 3.83$ ,  $p =$

0.00). Zoo Guides donated an even larger number of dollars on the post-program test (\$18  $\pm$  12.36). However, this increase from the post-training test was not significant ( $df = 14$ ,  $t = 0.59$ ,  $p = 0.28$ , Fig. 4.3, Table 4.4). Zoo Guides expressed the wish to donate more money to a conservation cause after training, but working on exhibit did not influence Zoo Guides to donate even more hypothetical money. Zoo Guides displayed significantly more interest in wildlife and wildlife conservation after training. They also displayed significantly more interest after working on exhibit than they did before training. But working on exhibit did not make a significant difference after training.

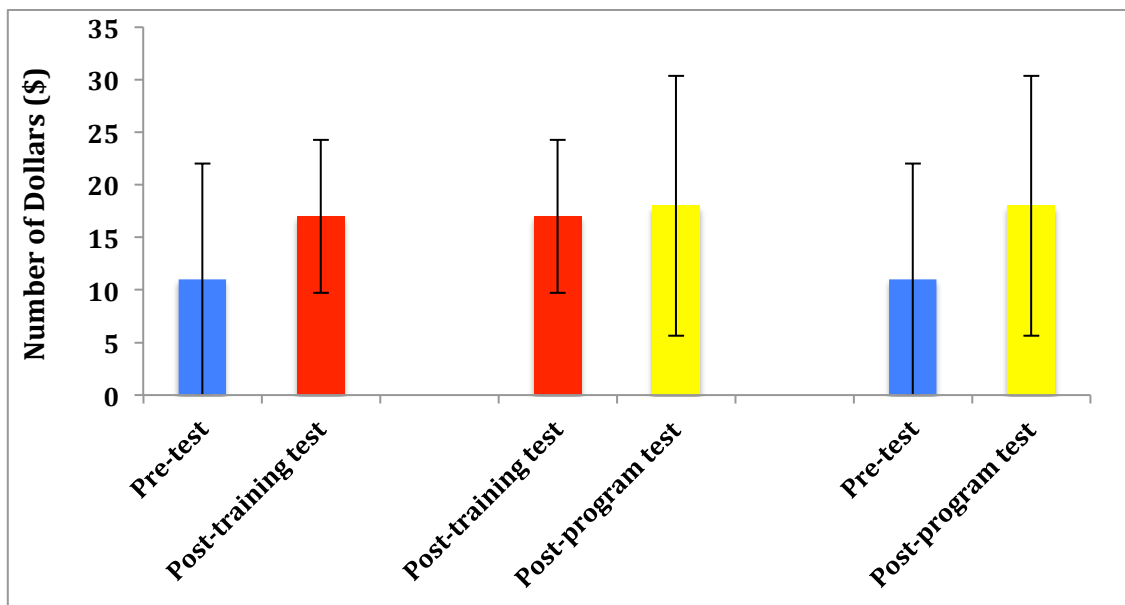


Figure 4.3: Mean ( $\pm$  SD) hypothetical money donated to biodiversity loss on surveys compared between the pre-test (blue) and the post-training test (red), between the post-training test (red) and the post-program test (yellow), and between the pre-test (blue) and the post-program test (yellow).

Table 4.7: Matched pair t-test results for interest in wildlife and wildlife conservation through hypothetical money donated to biodiversity loss between three surveys.

Survey	Mean $\pm$ SD	P-value (T-value)	
		Comparison With Post-training Test	Comparison With Post-program Test
<b>Pre-test</b>	11 $\pm$ 10.10	***0.00(3.83)	***0.00 (5.56)
<b>Post-training Test</b>	17 $\pm$ 7.51	N/A	0.28 (0.59)
<b>Post-program Test</b>	18 $\pm$ 12.36	0.28 (0.59)	N/A

$n = 15$ ,  $df = 14$ ,  $*p < 0.1$ ,  $**p < 0.05$ ,  $***p < 0.01$

Zoo Guides were expected to increase their interest in wildlife and wildlife conservation as a result of the program. In addition, working on exhibit was expected to have a bigger impact on wildlife interest than training. The survey results fulfilled the expectations of the first hypothesis. However, because there was not significantly more interest based on the Zoo Guides' survey responses between working and training, the expectations of the second hypothesis were not fulfilled.

#### *Qualitative Evidence*

When senior Zoo Guides were asked why they returned as a Zoo Guide, each Zoo Guide had his or her own personal reason for returning (Table 4.8). However, one senior Zoo Guide relayed enjoyment in being able to talk about the animals at the zoo:

“I like working with kids and teaching them about mammals or something.”

When asked about their experiences their first year as Zoo Guides, three out of four Zoo Guides recalled gaining appreciation for the zoo and learning about its animals:

“I gained a lot of respect, more respect, for the zoo than you have as just a visitor.”

“I enjoyed learning about the zoo, I learned about pretty much every animal at the zoo.”



When asked if their lives changed as a result of being a Zoo Guide, one Zoo Guide noted increased environmental awareness:

“I’m more aware towards the environment and animals, now that I know more like about them.”

Table 4.8: Returning Zoo Guide interview responses. Key themes and phrases coded from responses are given under their corresponding interview question. Each key theme or phrase is followed by the percentage of tallied responses out of a total of 4.

<b>Why did you decide to return as a guide?</b>	<b>What was your experience your first year as a guide?</b>
Fun (25%)	Previously fun, now a waste of time (20%)
Positive experience (25%)	Gained knowledge (40%)
Interacting with people (25%)	Gained respect for the zoo (20%)
Leadership (25%)	Gained skills (20%)
<b>How has your life changed as a result of being a guide?</b>	<b>Do you feel more prepared for more jobs as a result of being a guide?</b>
Maturity (25%)	Maturity (20%)
Environmentally aware (25%)	Confidence in speaking with many different people (40%)
Improved skills (50%)	Gained workplace skills (20%)
	Does not feel more prepared (20%)

Qualitative evidence for increased interest in wildlife and wildlife conservation was also supported by new Zoo Guide journals. On the first question of the May journal (Table 4.3), Zoo Guides were asked about their first day working. As was noted previously, many Zoo Guides were nervous and scared (52.94%). However, there were also Zoo Guides who expressed excitement in talking about animals with guests (35.33%):

“Very fun! There were a lot of people here, and they were very interested in the facts I told them about the animals.”

On the first question of the June journal (Table 4.4), Zoo Guides were asked to describe their favorite station to work from. As was also mentioned previously, many of the Zoo Guides identified their favorite stations as those in which they knew the most

information (33.33%). However, a few Zoo Guides described their favorite stations based on characteristics that made the animals in question unique or fun (26.77%):

“Lion, because I find it fascinating that they could destroy a ball within 30 minutes.”

“My favorite station is the elephant because they love to eat jellybeans, they are very cute.”

One Zoo Guide expressed interest in the conservation issues involving his or her favorite animal on exhibit:

“I just love elephants, I think they’re very gentle and beautiful, I would like to raise awareness about how endangered they are. 99 die every day.”

The first question on the August journal (Table 4.9) asked the Zoo Guides they felt like they have made a difference as a Zoo Guide and why or why not. Many of their responses pertained to themselves and improving their own abilities (33.34%). However, many Zoo Guides also referenced their ability to teach guests (53.33%):

“Yes, because I feel when people leave my cart they leave with information they didn’t know or wanted to know.”

A couple Zoo Guides mentioned the power of their ability to educate guests in terms of making other people care about animals and environmental issues:

“Yes, because I know that I am able to educate visitors here in ways that may convince them to take steps to better our environment.”

“Yes, because I felt like I made people care more about the animals with the facts I shared.”

The second question on the August journal (Table 4.9) asked the Zoo Guides if they would return as Zoo Guides next year and why or why not. Responses were diverse both in favor and against the possibility of returning as a Zoo Guide in the following year. While two Zoo Guides expressed that they did not want to return, a few Zoo Guides did express their wish to return because they enjoyed learning new things and being at the zoo (26.67%):

“Yes because I enjoy working at the zoo and almost every day I learn something new.”

“I would return next year because it has been a good experience and I’ve learned a lot along the way and increased the way I learn, etc.”

However, based on these responses, it cannot be definitively interpreted that the Zoo Guides enjoy working in the zoo and learning because they are interested in wildlife and wildlife conservation. This was not explicitly or implicitly stated.

Table 4.9: New Zoo Guide journal responses for August. Key themes and phrases coded from responses are given under their corresponding journal question. Each key theme or phrase is followed by the percentage of tallied responses out of a total of 15.

<b>Do you feel like you've made a difference as a guide? Why or why not?</b>	<b>Would you return as a guide next year? Why or why not?</b>
Educate others (53.33%)	No (40.0%)
Confidence (26.67%)	Yes (26.67%)
Educate self (6.67%)	Not sure (20.0%)
Entertain (13.33%)	I would if I could (13.33%)

From all of the qualitative data stated above, it is clear that the Zoo Guides do enjoy learning about the animals for which they educate guests. They find animals fascinating for their unique characteristics. Some Zoo Guides not only found interest in animals, but also their conservation and making guests aware of conservation issues. It is

also clear that much of this interest was not as prevalent in the Zoo Guides before they began the Zoo Guides program. What is less clear is whether that interest increased more as they spent time working on exhibit or whether it was due chiefly to training. The Zoo Guides were expected to increase their interest in wildlife and wildlife conservation as a result of the program. In addition, working on exhibit was expected to have a bigger impact on wildlife interest than training. The returning Zoo Guides' and new Zoo Guides' responses from interviews concludes that they did increase their interest in wildlife and wildlife conservation as a result of the program. However, their responses do not definitively conclude that working had a larger impact on this interest than training.

### RESEARCH QUESTION 3: DO ZOO GUIDES INCREASE THEIR AWARENESS AND INTEREST IN RELATED CAREERS AS A BYPRODUCT OF BEING IN THE PROGRAM?

#### *Quantitative Evidence*

Zoo Guides were asked to list three careers they might be interested in. Zoo Guides did not list many wildlife related careers on any of the survey. In fact, the mean number of careers reported was less than one on every survey. The mean number of reported careers did increase from the pre-test ( $0.13 \pm 0.45$ ) to the post-training test ( $0.60 \pm 1.45$ ) and the post-program test ( $0.60 \pm 1.10$ ). However, the mean did not increase from the post-training test to the post-program test (Fig. 4.4). Zoo Guides were expected to increase their interest in related careers as a result of the program. In addition, working on exhibit was expected to have a bigger impact on career interest than training. Based on Zoo Guides' survey responses the expectations of the first hypothesis were fulfilled because they listed

more related careers on the post-training test and the post-program test than on the pre-test. However, the expectations of the second hypothesis were not fulfilled because they did not list more related careers on the post-program test than on the post-training test.

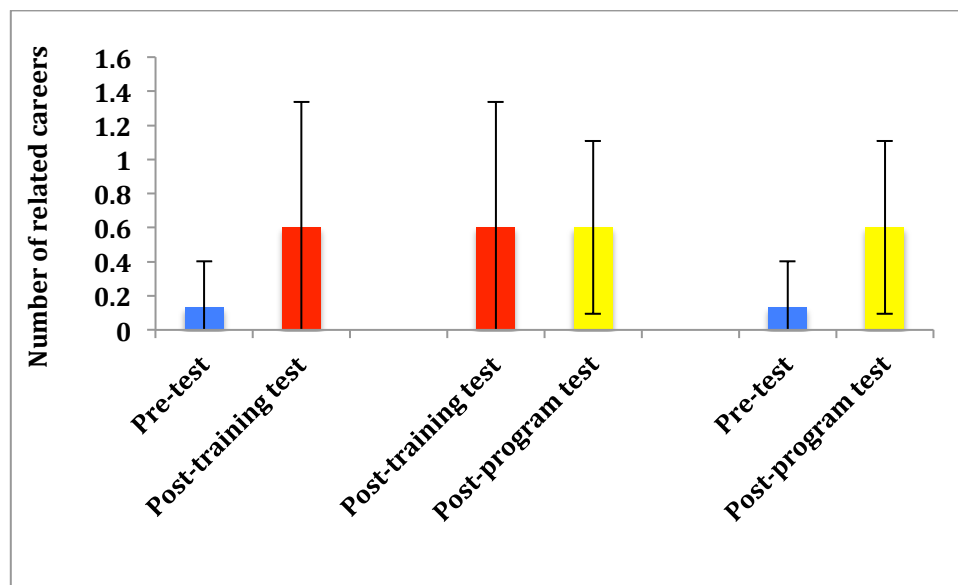


Figure 4.4: Mean ( $\pm$  SD) numbers of related careers reported on surveys compared between the pre-test (blue) and the post-training test (red), between the post-training test (red) and the post-program test (yellow), and between the pre-test (blue) and the post-program test (yellow).

### *Qualitative Evidence*

In interviews with senior Zoo Guides (Table 4.8), none explicitly stated high interest and awareness of wildlife related careers as a result of any part of the program. For the most part, they enjoyed working at the zoo and gaining skills as a result of the job. One Zoo Guide stated that he or she enjoyed working at the zoo previously and appreciated having a job, but now had second thoughts about being there:

“I did have fun, but now it doesn’t feel really. I don’t know, I’m starting college, it feels like I’m wasting my summer.”

One individual liked teaching guests about zoo animals and agreed that he or she gained skills as a result of the job. However, he or she did not think those skills would necessarily contribute to jobs or career choice in the future:

“I felt I was already prepared cause after high school I’m leaving for the marines so I’m already on track for that.”

Other senior Zoo Guides cite skills in interacting with many types of people (40.0%) as a component that would help them with jobs in the future. However, none of the senior Zoo Guides discussed the Zoo Guides program as a stepping-stone for careers in wildlife related fields, or any type of STEM career.

Similarly, to the senior Zoo Guides, few new Zoo Guides expressed increased interest or awareness of wildlife related careers. On the May journal (Table 4.3), if not expressing nervousness (52.94%), Zoo Guides wrote about how excited they were to work as a Zoo Guide (35.44%). Zoo Guides discussed how they enjoyed working with people in a zoo environment and found the job interesting:

“My first experience was fun because me and my co-workers get along. Also everything was very interesting.”

No one stated, however, that they thought being a Zoo Guide was exciting because they are interested in working with wildlife, or even considering a STEM career. Similarly, on the June (Table 4.4) and July (Table 4.5) journals, Zoo Guides mentioned occasionally how they enjoy teaching guests about wildlife. One Zoo Guide even mentioned how he or she wants to educate people about conservation:

“I just love elephants, I think they’re gentle and beautiful, I would like to raise awareness about how endangered they are.”

It cannot be said, however, that this Zoo Guide wants to raise awareness for endangered animals as part of a career. None of the other Zoo Guides implied that their enjoyment of educating guests or seeing the animals on exhibit would lead to a career in the future. On the August journal (Table 4.9), many Zoo Guides said that they enjoyed working at the zoo, even if they cannot or would not return to the ZooGuides program again (40%):

“I enjoy working at the zoo and almost every day I learn something new.”

“I would [return] but I can’t because I’ll be shipping off.”

One Zoo Guide said that he or she wants to work in a zoo after the program:

“I am going to college but I would like to work in the zoo. I just like the view, and also the work place.”

Based on these responses, it is difficult to say that any Zoo Guide has decided to change career paths because of the Zoo Guides program. However, Zoo Guides clearly grew to enjoy their time working in the zoo, and at least one individual has decided he or she would like to work in a zoo in the future. The Zoo Guides were expected to increase their interest in related careers as a result of the program. In addition, working on exhibit was expected to have a bigger impact on career interest than training. Based off of both the senior and new Zoo Guides’ responses neither of these hypotheses were fulfilled as none of the Zoo Guides discussed their desire to help wildlife as a career.

#### RESEARCH QUESTION 4: DO ZOO GUIDES INCREASE THEIR ABILITY TO EDUCATE GUESTS IN AN ENGAGING AND EFFECTIVE WAY?

##### *Quantitative Evidence*

Zoo Guides' self-reported confidence in their own ability to educate guests was did not increase significantly between the pre-test and the post-training test ( $df = 3$ ,  $X^2 = 2.41$ ,  $p = 0.12$ ). However, it did increase significantly between the post-training test and the post-program test ( $df = 3$ ,  $X^2 = 10.0$ ,  $p = 0.01$ ). Zoo Guides had more confidence in their ability to educate guests before training than after training, but this confidence increased significantly after working on exhibit (Fig. 4.5, Table 4.10).

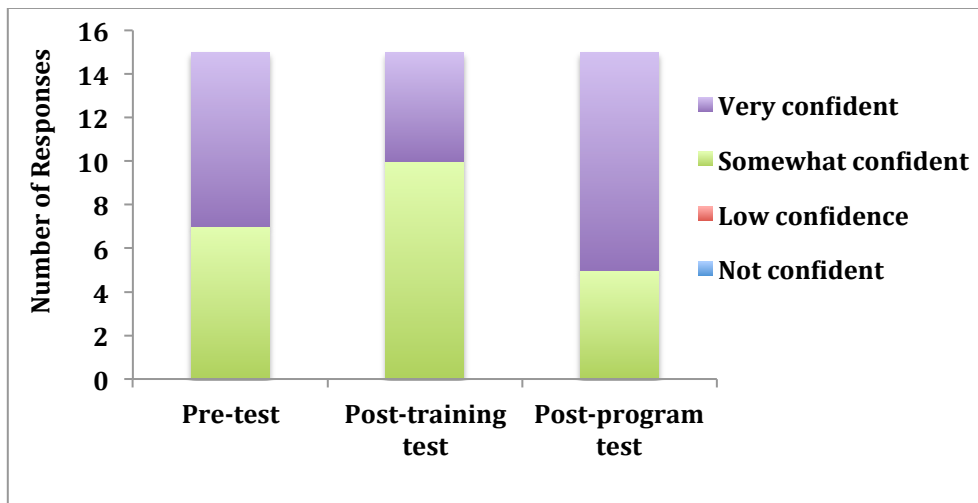


Figure 4.5: Distributions of four categories of self-reported Zoo Guide confidence in ability to educate guests were compared between each survey.



Table 4.10: Chi-square results for distributions of confidence in ability to educate guests. The number of responses for each category of self-reported Zoo Guide confidence in ability to educate guests is provided with the percentage out of 15 in parentheses. P-values calculated by comparing each survey's distribution with a chi-square distribution test are also provided with the corresponding chi-square value in parentheses.

Survey	N (%)			
	Not confident	Low Confidence	Somewhat Confident	Very Confident
<b>Pre-test</b>	0.0 (0.00%)	0.0 (0.00%)	7 (46.67%)	8 (53.33%)
<b>Post-training Test</b>	0.0 (0.00%)	0.0 (0.00%)	10 (66.67%)	5 (33.33%)
<b>Post-program Test</b>	0.0 (0.00%)	0.0 (0.00%)	5 (33.33%)	10 (66.67%)
	P-value ( $X^2$ )			
	Comparison With Post-training Test		Comparison With Post-program Test	
<b>Pre-test</b>	0.12 (2.41)		0.30 (1.07)	
<b>Post-training Test</b>	N/A		***0.00 (10.00)	

$df = 3$ ,  $*p < 0.1$ ,  $**p < 0.05$ ,  $***p < 0.01$

Guest interest levels based on observations of guest-Zoo Guide interactions differed significantly between May and every month ( $df = 3$ ,  $X^2 > 6.25$ ,  $p < 0.10$ ). This is primarily due to the fact that a small amount of “Disinterest” interactions (8%) were observed in May that were not observed in subsequent months. June’s distributions were also significantly different than July’s ( $df = 3$ ,  $X^2 = 8.19$ ,  $p = 0.02$ ). However, neither June’s nor July’s were significantly different than August’s distributions ( $df = 3$ ,  $X^2 < 6.25$ ,  $p > 0.10$ ). Based on observations of guest engagement, Zoo Guides became significantly better at engaging guests after May as a result of the program, though they were engaging guests less in July than in June and August (Fig.4.6, Table 4.11).

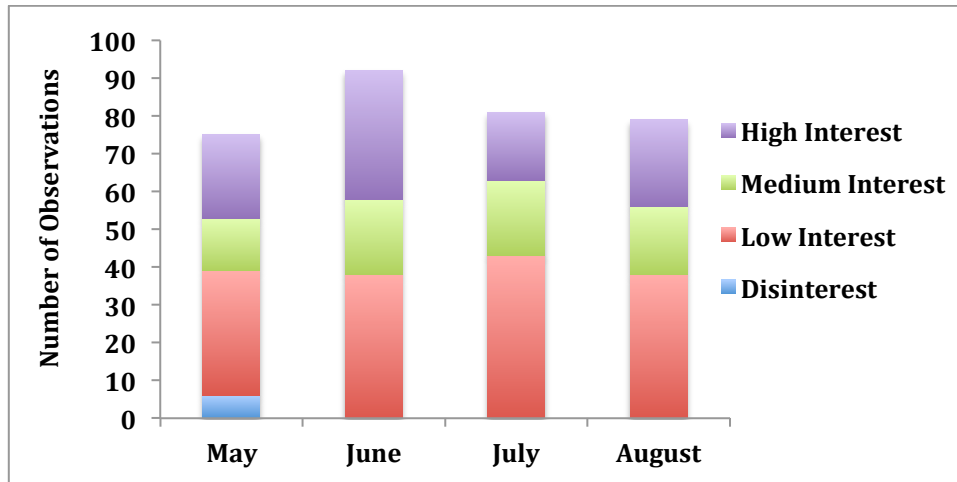


Figure 4.6: Distributions of four categories of guest engagement were compared between observations taken in May (n = 75), June (n = 92), July (n = 81), August (n = 79).

Table 4.11: Chi-square results for distributions of four guest interest levels between four months of observations. The number of responses for each category of guest engagement is provided with the percentage out of 75 (May), 92 (June), 81 (July), or 79 (August) in parentheses. P-values calculated by comparing each month's distribution with a chi-square distribution test are also provided with the corresponding chi-square value in parentheses.

Month of Observation	N (%)			
	Disinterest	Low Interest	Medium Interest	High Interest
May	6 (8.00%)	33 (44.00%)	14 (18.67%)	22 (29.33%)
June	0 (0.00%)	38 (41.30%)	20 (21.74%)	34 (36.96%)
July	0 (0.00%)	43 (53.10%)	20 (24.69%)	18 (22.22%)
August	0 (0.00%)	38 (48.10%)	18 (22.78%)	23 (29.11%)
	P-value (X <sup>2</sup> )			
	Comparison With June	Comparison With July	Comparison With August	
May	*0.00 (15.87)	*0.01 (12.33)	*0.05 (7.95)	
June	N/A	*0.02 (8.187)	0.15 (3.76)	
July	*0.02 (8.19)	N/A	0.34 (2.17)	

$df = 3$ , \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

When guests were asked in interviews if they thought Zoo Guides were confident after interacting with them, guests agreed every time each month (Fig. 4.7), meaning there were no significant differences between each month ( $df = 1$ ,  $X^2 < 2.7$ ,  $p > 0.10$ ).

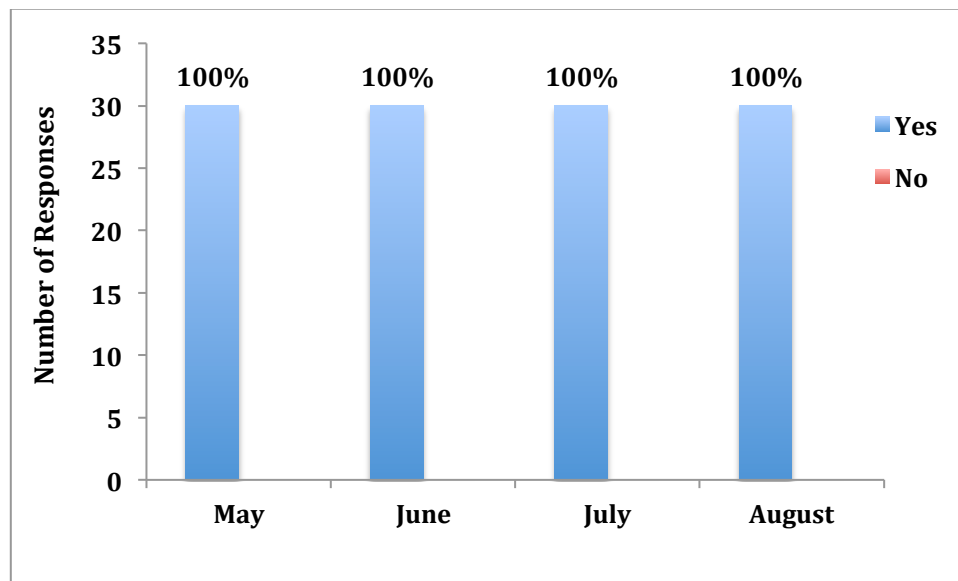


Figure 4.7: Distributions of guest agreement with Zoo Guide confidence were compared between interviews taken each month ( $n = 30$  for each month).

When asked if they learned anything from the Zoo Guides, there was a significant difference in response distribution between each month ( $df = 1$ ,  $X^2 < 2.7$ ,  $p < 0.10$ ), except between June and August ( $df = 1$ ,  $X^2 = 2.1$ ,  $p = 0.14$ , Table 4.12). There were varying levels of disagreement in May, June, and July, but all interviewed guests agreed that they had learned something in August (Fig. 4.8).

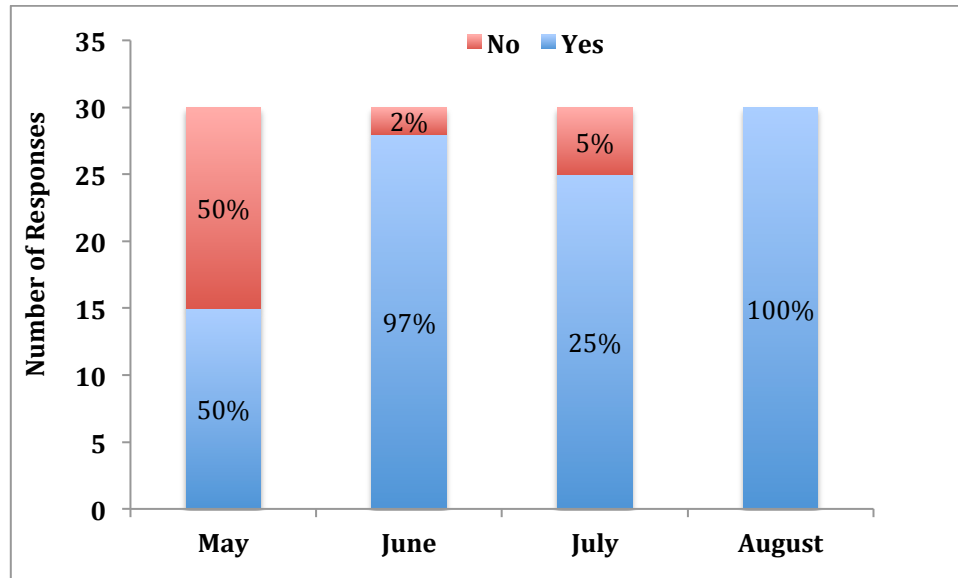


Figure 4.8: Distributions of guest agreement with learning from Zoo Guides were compared between interviews taken each month (n = 30 for each month).

Table 4.12: Chi-square results for the number of guest responses agreeing or disagreeing with learning from Zoo Guides is provided with the percentage out of 30 for each month in parentheses. P-values were calculated by comparing each month's distribution with a chi-square distribution test are also provided with the corresponding chi-square value in parentheses.

Month of Interview	N (%)		
	Yes		No
May	15 (50.00%)		15 (50.00%)
June	28 (97.00%)		2 (3.00%)
July	25 (83.00%)		5 (17.00%)
August	30 (100.00%)		0 (0.00%)
	P-value ( $X^2$ )		
	Comparison With June	Comparison With July	Comparison With August
May	***0.00 (17.93)	***0.00 (13.33)	***0.00 (30.00)
June	N/A	***0.028 (4.82)	0.14 (2.14)
July	***0.03 (4.82)	N/A	**0.01 (6.00)

$df=1$ , \* $p<0.1$ , \*\* $p<0.05$ , \*\*\* $p<0.01$

When guests were asked about what they had learned, distributions of learning levels changed significantly between each month ( $df = 2$ ,  $X^2 > 4.6$ ,  $p < 0.10$ , Table 4.13). “Advanced” pieces of knowledge were not discussed in a single interview in May and June, while a small percentage of responses qualified as “Advanced” in July (23.08%) and August (16.66%, Fig. 4.7).

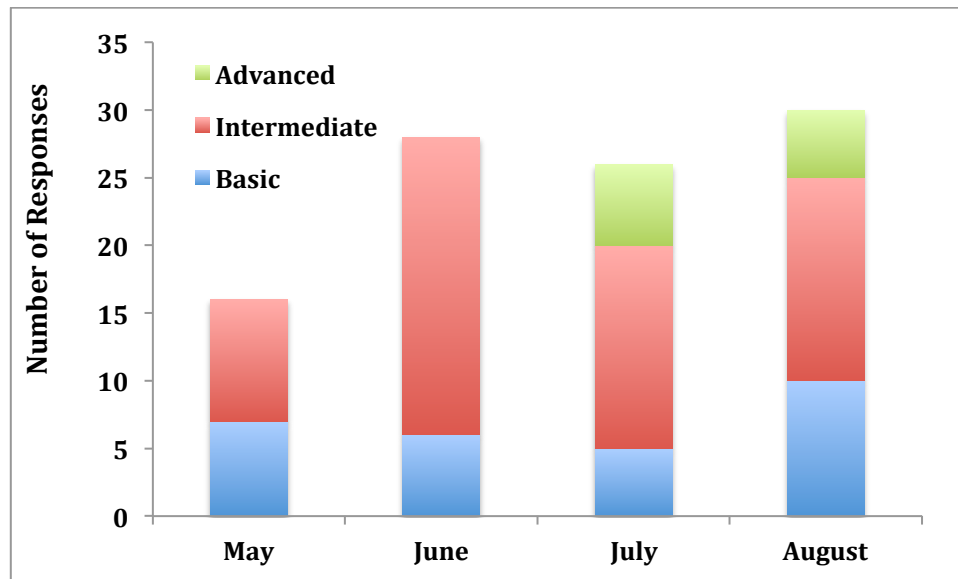


Figure 4.9: Distributions of categories of guest learning as “Advanced” (Green), “Intermediate” (red) and “Basic” (blue) were compared between interviews taken in May ( $n = 16$ ), June ( $n = 28$ ), July ( $n = 26$ ), and August ( $n = 30$ ).

Table 4.13: Chi-square results for distributions of three levels of guest learning between four months of interviews is provided with the percentage out of 16 (May), 28 (June), 26 (July), and 30 (August). P-values were calculated by comparing each month's distribution with a chi-square distribution test are also provided with the corresponding chi-square value in parentheses.

Month of Interview	N (%)		
	Basic	Intermediate	Advanced
May	7 (43.75%)	9 (56.25%)	0 (0%)
June	6 (21.43%)	22 (78.57%)	0 (0%)
July	5 (19.23%)	15 (57.69%)	6 (23.08%)
August	10 (33.33%)	15 (50%)	5 (16.67%)
	P-value ( $X^2$ )		
	Comparison With June	Comparison With July	Comparison With August
May	***0.00 (18.92)	**0.01 (10.57)	**0.02 (10.29)
June	N/A	***0.01 (8.427)	***0.01 (9.89)
July	****0.01 (8.427)	N/A	*0.08 (5.17)

$df = 2$ , \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

Based on the quantitative results, Zoo Guides belief in their own ability to educate guests decreased after five weeks of training, but then increased significantly after working on exhibit for four months. Guest observation and interview results also indicated higher guest engagement and learning by the end of the Summer 2017 program. This supports the initial hypothesis that Zoo Guides would increase their ability to educate guests as a result of the program. In addition, working on exhibit was expected to have a bigger impact on ability than training. Quantitative results from the perspectives of both Zoo Guides and guests supported that hypothesis. Zoo Guides became more confident in their own ability after working on exhibit. Guests were also more engaged with Zoo Guides and reported higher levels of learning at the end of the working season than at the beginning.

### *Qualitative Evidence*

In interviews with Zoo Guide supervisors, in May the first supervisor described Zoo Guides' interactions with guests as good, but that their skills needed to improve (Table 4.14):

“They’re interacting well with the public.”

“A couple of them are still reserved. They don’t take the first step.”

The second supervisor described the division between Zoo Guides as some demonstrated good skills, but others needed to improve (Table 4.15):

“Some dive right in, some are shy.”

In June the first supervisor described Zoo Guides' interactions with guests (Table 4.14), as some had done were doing better, but others were still the same. However, all their skills and attitudes were described as better than they were in May:

“Some of them have gotten right in. Some are still shy and will let people walk by.”

“They’re much better than how they started off.”

The second supervisor described Zoo Guides' interactions with guests as being generally the same as it was from the beginning (Table 4.15), but that their skills and attitudes were better:

“Some are still shy. People need to walk away with one fact and some are still struggling with that.”

“They know how to explain things better.”

“There’s improvement. They’re not just sitting anymore.”

In July, the first supervisor could not generalize the Zoo Guides' interactions with guests or their attitude (as they were so variable). Some of their guest interactions had improved and some were the same. For some Zoo Guides, their attitude improved, but for others, it got worse. Overall, their skills had improved (Table 4.14):

“Most are using hooks to get the visitors interested in the biofacts they have and are teaching visitors so that when visitors leave their cart the visitors have acquired information about the animals.”

“A lot of them have improved their knowledge of the animals.”

“A few have shown evidence of ‘summer slump,’ which basically means not putting forth 100% effort, not engaging with the public, etc.”

The second supervisor said Zoo Guides' interactions with guests had improved, as well as their attitude, but did not mention their skills (Table 4.15):

“They are more comfortable talking to visitors.”

“As for attendance, that has also improved a lot.”

By August, the first supervisor said some of the Zoo Guides improved in interaction with guests, but others were still the same, though their skills were better. They were completely divided in attitude, however, as some had improved, some were the same, and some had gotten worse (Table 4.14):

“One girl was really shy when we first started and she's really grown in confidence. She's not just spitting out facts... people want to say and listen. One third have gotten to that point.”

“One third have done a good job. Visitors become more knowledgeable, but it's still formal.”



“Some rest on their laurels and see it as just having a job. One sat in front of the exhibit. Some look at their cell phones.”

The second supervisor did not mention Zoo Guide’s interactions with guests. However, their skills had improved, some of them improved their attitude while some of their attitudes worsened (Table 4.15):

“I believe we made some of them more responsible in terms of having a job and getting to their shift on time, etc.”

“There were a couple that checked out at the end, didn’t show, or asked for a lot of time off.”

Table 4.14: The first supervisor’s responses to questions about Zoo Guides.

Category	May	June	July	August
<b>Interactions With Guests</b>	Good	Some better, some same	Some better, some same	Some better, some same
<b>Interactions With Each Other</b>	Good	Same	N/A	Better
<b>Skills</b>	Bad	Better	Better	Better
<b>Attitude</b>	N/A	Better	Some better, some worse	Some better, some same, some worse

Table 4.15: The second supervisor’s responses to questions about Zoo Guides.

Category	May	June	July	August
<b>Interaction With Guests</b>	N/A	Same	Better	N/A
<b>Interaction With Each other</b>	Some bad, some good	Some better, some same	Some better, some same	Better
<b>Skills</b>	Ok	Better	N/A	Better
<b>Attitude</b>	Bad	Better	Better	Some better, some worse

It was difficult for the supervisors to generalize progression of the group during interviews. Each Zoo Guide had a journey of his or her own throughout the program.

While some individuals did not improve in their ability to educate guests by the end of the program, and may have even become worse, a majority of the cohort saw improvement in their commitment and abilities.

Journals given to new Zoo Guides provided more perspective on their own ability to educate guests. As was stated in previous sections, Zoo Guides were divided in their responses from May (Table 4.3). Some were nervous and fixated on being able to memorize facts for guests:

“It was scary because I thought that I would give false information out or not know anything at all.”

Other Zoo Guides were excited and cited their ability to remain confident with people while teaching them about animals on exhibit:

“There were a lot of people here, and they were very interested in the facts I told them about the animals.”

Also, in the May journal (Table 4.3), Zoo Guides were asked if there was ever a situation in which they did not know how to answer a question and how they handled the situation. With the exception of one individual, every Zoo Guide encountered a question he or she could not answer. In these situations, however, all Zoo Guides were intent on giving guests correct information. They all said they would either simply say they were unsure, find a supervisor, or find the correct answer and contact the guest with the information.

In June, Zoo Guides were asked to describe a part (or parts) of being a Zoo Guide they thought they could improve on (Table 4.4). A few Zoo Guides said they wanted to become more knowledgeable (21.43%):

“To learn more info about animals.”

“Know more info on all the stations.”

Half of the Zoo Guides wanted to speak up more, or become more engaging for guests by making their discussions more interesting or entertaining:

“Speaking up more and trying not to be shy.”

In July (Table 4.5), when Zoo Guides were asked about when they felt they did their best as Zoo Guides, almost all of them described a time when they were able to give a lot of accurate information to guests (58.83%):

“When I was giving them the right information for elephants.”

“The moment that I felt I did my best was when I did the elephant cart I did by myself it went really good and I knew my stuff, but I got lots of information to visitors and they asked a lot of questions, the total was 800 for only 3 hours.”

In this journal, only one Zoo Guide mentioned his or her ability to educate guests in an interesting way:

“I chose to do Ocelot and I was the only guide to do it for that day, but instead of going to ocelot I went to the clouded leopard not knowing, so what I did was a comparison between them and other feline cats.”

In August, Zoo Guides were asked if they felt like they’ve made a difference as a Zoo Guide (Table 4.9). Some Zoo Guides cited self-improvement (33.34%), but most talked about their ability to improve guests’ visits to the zoo and to change perspectives on wildlife and conservation (66.67%):

“Yes because I feel like I made people care more about the animals with the facts I shared.”

“Yes because everyday people have learned new things from me.”

Based on the interview and journal responses, not all Zoo Guides improved their ability to educate guests in an engaging and effective way as a result of the program. There were individuals who simply stated facts to guests up until the end of August and there were some who stopped trying to teach guests anything. However, many Zoo Guides did improve and not only regurgitated information, but also tried to make guests' visits more enriching through engaging educational techniques.

Zoo Guides were expected to increase their ability to educate guests as a result of the program. In addition, working on exhibit was expected to have a bigger impact on ability than training. Qualitative results from supervisors' and Zoo Guides' perspectives partially supported these hypotheses. Many of the Zoo Guides did improve their ability to educate as a result of working on exhibit through the program. However, there were individuals who did not improve as a result of the program.

#### RESEARCH QUESTION 5: DO ZOO GUIDES GAIN RELEVANT WORKPLACE SKILLS AS A RESULT OF THE PROGRAM?

##### *Quantitative Evidence*

Zoo Guides consistently ranked themselves highly on Likert scale questions on surveys asking about their comfort with various workplace skills. Zoo Guides were not significantly more comfortable, on average, with working with other people on the post-training test ( $5.00 \pm 0.81$ ) than the pre-test ( $5.00 \pm 0.78$ ), ( $df = 14$ ,  $t = 0.76$ ,  $p = 0.41$ ). They were significantly more confident on the post-program test ( $5.7 \pm 0.49$ ), ( $df = 14$ ,  $t > 1.4$ ,  $p < 0.10$ ) in comparison with the pre-test and the post-training test (Fig. 4.8, Table 4.16).

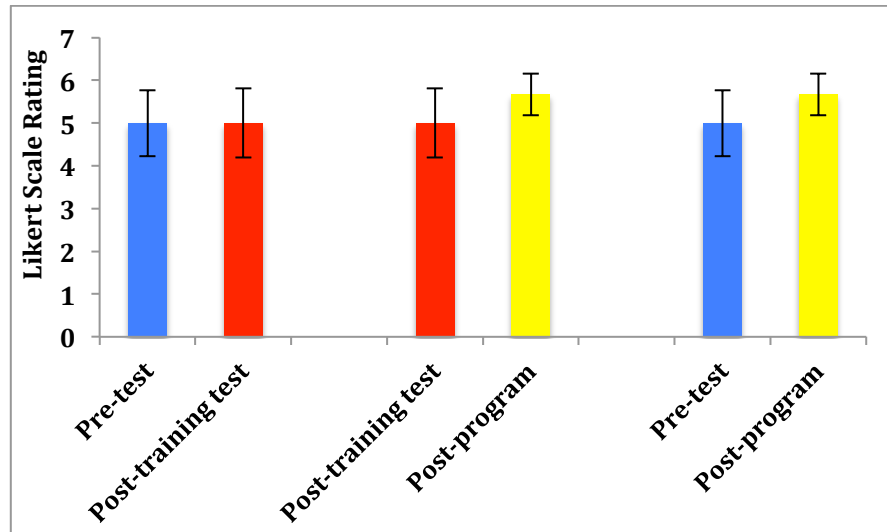


Figure 4.10: Mean ( $\pm$  SD).Likert scale ratings for Zoo Guide's comfort in working with other people compared between the pre-test (blue) and the post-training test (red), between the post-training test (red) and the post-program test (yellow), and between the pre-test (blue) and the post-program test (yellow).

Table 4.16: Matched pair t-test results for mean Likert scale rating for comfort in working with other people among three surveys.

Survey	Mean $\pm$ SD	P-value (T-value)	
		Comparison With Post-training Test	Comparison With Post-program Test
<b>Pre-test</b>	5.00 $\pm$ 0.78	0.42 (0.76)	*0.07 (1.60)
<b>Post-training Test</b>	5.00 $\pm$ 0.81	N/A	*0.07 (1.63)
<b>Post-program Test</b>	5.70 $\pm$ 0.49	*0.07 (1.63)	N/A

Scale of 1–6,  $n = 15$ ,  $df = 14$ , \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

Zoo Guides were not significantly more comfortable in talking about conservation issues between the pre-test ( $4.70 \pm 1.3$ ) and the post-training test ( $5.00 \pm 1.10$ ), or between either of those surveys and the post-program test ( $5.10 \pm 0.90$ ), ( $df = 135$ ,  $t > 1.4$ ,  $p > 0.10$ , Fig. 4.9).

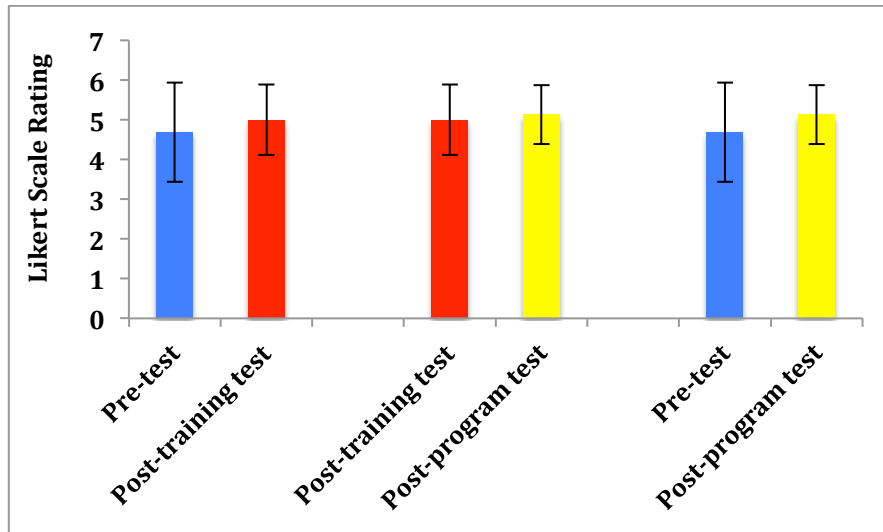


Figure 4.11: Mean ( $\pm$  SD) Likert scale ratings of Zoo Guide's comfort in talking about conservation compared between the pre-test (blue) and the post-training test (red), between the post-training test (red) and the post-program test (yellow), and between the pre-test (blue) and the post-program test (yellow).

There were no significant differences in mean comfort in talking to supervisors between any of the surveys, as the mean was equivalent to 5 on each one ( $df = 14$ ,  $t > 1.35$ ,  $p > 0.10$ , Fig. 4.10).

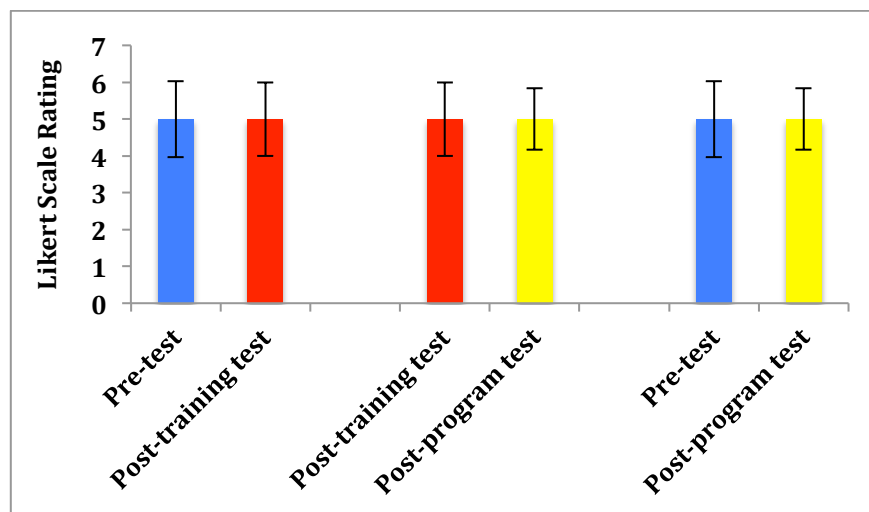


Figure 4.12: Mean ( $\pm$  SD) Likert scale ratings for Zoo Guide's comfort in talking to supervisors compared between the pre-test (blue) and the post-training test (red), between the post-training test (red) and the post-program test (yellow), and between the pre-test (blue) and the post-program test (yellow).

There were no significant differences in means of confidence in ability to talk to groups of people between the pre-test ( $4.90 \pm 1.00$ ) and the post-training test ( $5.00 \pm 1.00$ ) or between the post-training test and the post-program test ( $5.50 \pm 1.00$ ), ( $df = 14$ ,  $t > 1.35$ ,  $p > 0.10$ ). However, there was a significant difference between the pre-test and the post-program test ( $df = 14$ ,  $t = 1.90$ ,  $p = 0.09$ , Fig. 4.11, Table 4.17).

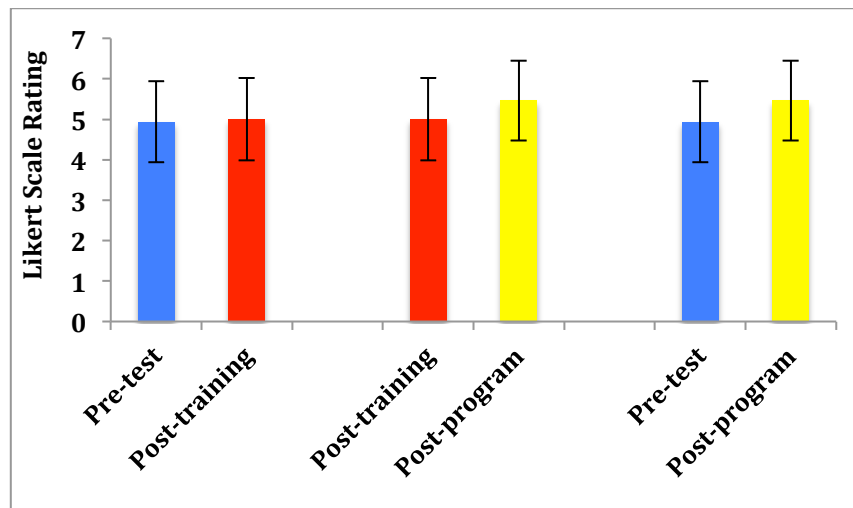


Figure 4.13: Mean ( $\pm$  SD) Likert scale ratings for Zoo Guide's confidence in ability to talk to groups of people compared between the pre-test (blue) and the post-training test (red), between the post-training test (red) and the post-program test (yellow), and between the pre-test (blue) and the post-program test (yellow).

Table 4.17: Matched pair t-test results for mean Likert scale ratings for Zoo Guide's confidence in ability to talk to groups of people compared with each other.

Survey	Mean $\pm$ SD	P-value (T-value)	
		Comparison With Post-training Test	Comparison With Post-program Test
Pre-test	4.90 $\pm$ 1.00	0.24 (0.72)	*0.09 (1.85)
Post-training Test	5.00 $\pm$ 1.00	N/A	0.31 (0.59)
Post-program Test	5.47 $\pm$ 0.99	0.31 (0.59)	N/A

Scale of 1–6,  $n = 15$ ,  $df = 14$ , \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

The mean comfort of Zoo Guides in answering zoo-related questions was equivalent on the pre-test ( $5.00 \pm 1.00$ ) and the post-training test ( $5.00 \pm 0.80$ ), so there was no significant difference ( $df = 14, t = 0.15, p = 0.44$ ). The mean was  $5.30 \pm 1.20$  on the post-program test, so it was not significantly different from either of the other surveys ( $df = 24, t > 1.4, p > 0.10$ , Fig. 4.12).

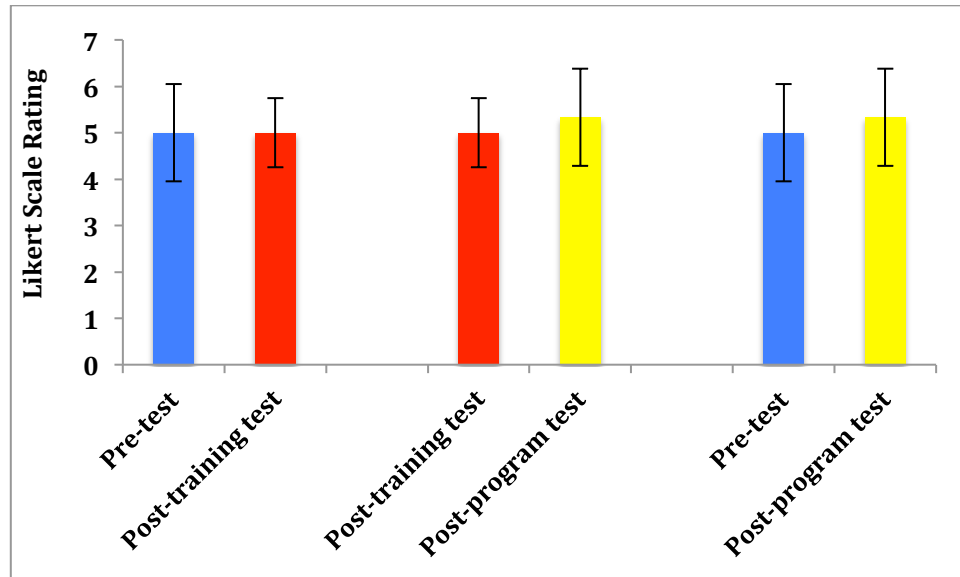


Figure 4.14: Mean ( $\pm$  SD) Likert scale ratings for Zoo Guide's comfort in answering zoo-related questions compared between the pre-test (blue) and the post-training test (red), between the post-training test (red) and the post-program test (yellow), and between the pre-test (blue) and the post-program test (yellow). Standard deviation bars are also provided for comparison.

When asked if they thought training helped in preparation for interacting with guests, the mean was 5.00 on both the post-training test ( $\pm 0.90$ ) and the post-program test ( $\pm 1.20$ ) and thus, there was no significant difference ( $df = 14, t > 0.76, p = 0.41$ , Fig. 4.13).



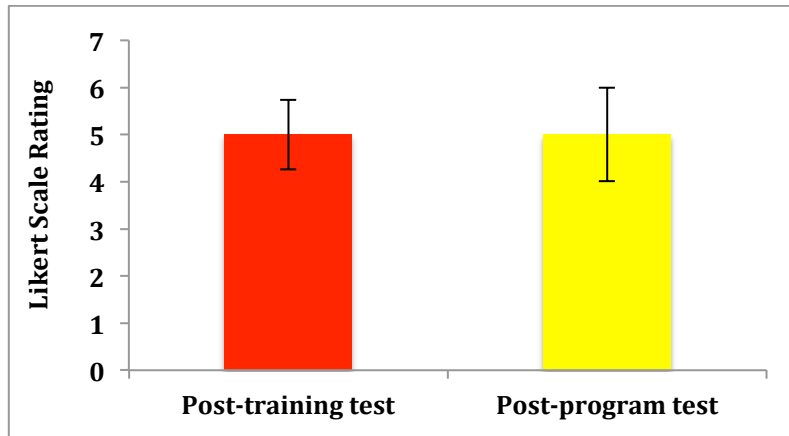


Figure 4.15: Mean ( $\pm$  SD) Likert scale rating for agreement that Zoo Guides training helped in preparation to interact with guests compared between the post-training test (red) and the post-program test (yellow).

When asked if skills gained as a Zoo Guide would be helpful in preparation for future jobs on the post-program test, the mean response was  $6.00 \pm 0.07$ . Based on these quantitative results from the surveys, Zoo Guides did not agree that most their relevant workplace skills increased significantly after training or after working on exhibit. Zoo Guides were expected to increase their ability to educate guests as a result of the program. In addition, working on exhibit was expected to have a bigger impact on ability than training. Quantitative results from the Zoo Guides' perspectives partially fulfill these expectations. Zoo Guides ranked their comfort with many of the skills highly on each survey with no significant difference after training or working on exhibit. Comfort in working with other people did increase significantly after training and more significantly after working, fulfilling the expectations of both hypotheses. Confidence in talking to groups of people increased significantly after training and working on exhibit, but working on exhibit did not have a higher impact on this comfort than training, which failed to fulfill the expectations of the second hypothesis.

### *Qualitative Evidence*

In the supervisor interviews in May (Table 4.14), the first supervisor thought Zoo Guides' interactions with each other, as co-workers, was good and their attitude was not mentioned:

“The group is bonding well. There are no major conflicts.”

The second supervisor described their interactions with each other with some interacting well and others needing improvement and their attitude was not mentioned (Table 4.15):

“They have a few bumps with each other, but it's nothing out of the ordinary.”

“There was an incident last weekend with the boys telling the girls what to do.”

In June, the first supervisor described their interactions with each other as the same as they were previously and described that their attitudes improved (Table 4.14):

“All have grown in some way.”

“Having seniors is great.”

The second supervisor said some Zoo Guides improved in working with each other, while some were the same. All of the Zoo Guides improved their attitude, as was discussed previously (Table 4.15):

“There are weaker and stronger ones. We don't have any fooling around. There are no behavior problems, and there were in the past. There are no partnership problems. They're focused on working and get along well.”

In July, the first supervisor did not discuss the group's interactions with each other. However, some Zoo Guides' attitude improved, while some worsened, as was discussed previously with the term “summer slump.” The second supervisor indicated some

improved in their interactions with each other and some not, while their attitudes improved, as was mentioned with attendance (Table 4.15):

“As a group, they get along well for the most part. We have a couple that don’t fit in completely, but some of that may be due to culture or an attitude.”

In August the first supervisor thought the Zoo Guide’s interactions with each other generally improved. However, attitude was split, with one third improved vastly, one third remained the same as they were, and one third worsened, as was previously discussed (Table 4.14):

“Some have grown tremendously.”

“Some rest on their laurels and see it as just having a job. One sat in front of an exhibit. Some only care about appearance. Some look at their cell phones. But most have done a good job. I really enjoyed working with them.”

The second supervisor thought Zoo Guides’ interactions with each other had improved, but split the attitude of the group in the same way the first supervisor did (Table 4.15).

“There was quite a bit of improvement through the season. I believe we made some of them more responsible in terms of having a job and getting there for their shift on time, etc. There were a couple that checked out at the end, didn’t show, or asked for a lot of time off. This could be attributed to knowing the job is ending, maturity, or just plain lack of work ethics.”

From the supervisors’ perspectives, there were individuals who did not learn workplace skills from the program. Or perhaps they were learning about their responsibilities, but chose not to put in their best effort. However, a majority of Zoo Guides improved in their maturity and responsibility throughout the program.

Interviews with senior Zoo Guides and new Zoo Guide journals provided Zoo Guides' perspectives on workplace skills they gained from the ZooGuides program. In their interviews (Table 4.8), the senior Zoo Guides said the program was their first job experience. One of the most common skills they thought they gained from the program was public speaking and the ability to interact with many different types of people:

"I've talked to a lot of visitors, so now I have the experience of talking with strangers."

"It like really helped me know like public speaking skills."

"I've had to work and interact with many different people from different countries or school."

Senior Zoo Guides also said the program taught them about professionalism:

"I've probably matured. This was still my first job last year and it's still my first job."

"This job has set you up in a professional manner so now the way you know what's expected of you in the workforce; to be on time... how to interact with people, the public, coworkers. This was my first job, so it did."

"I definitely have better time management and balancing, between athletics, school, and work."

In the May journal (Table 4.3), Zoo Guides were asked how they would handle a potential problem on the job; not knowing the answer to a guest's question. All Zoo Guides who had encountered this situation answered that they responded with reasonable a solution. Zoo Guides that experienced this situation (93.33%) responded they would

check with their supervisor, some said they would find out and get back to the guest, or they simply responded to the guest that they do not know the answer.

In the June journal (Table 4.4), Zoo Guides were asked what they thought they could improve upon. None of them responded that they could improve on professionalism, such as attendance, or being prompt. However, they did respond they wanted to improve on their other responsibilities as Zoo Guides in educating guests, such as being more engaging or speaking up to encourage guests to interact (57.14%).

In the July journal (Table 4.5), Zoo Guides were asked if they had encountered any conflicts with fellow Zoo Guides, and if so, how did they handle the conflict. A majority responded that they had not (71.43%). One Zoo Guide said that he or she had not, but if a conflict did happen, he or she was confident in his or her ability to resolve it:

“I actually haven’t had any conflicts with other guides but if I happened to do so I would handle it in the most professional way.”

Three Zoo Guides admitted to experiencing at least one conflict with other Zoo Guides. However, one of these individuals claimed that he or she was able resolve the conflict and then was able to work very well with his or her fellow Zoo Guides as co-workers:

“Yes and I would talk to one of the zoo guides that I work with.”

Another Zoo Guide resolved the conflict by discussing it with one of the supervisors:

“A zoo guide here always starts arguments with people [once] we worked together and he was yelling at me and swearing in front of visitors because I was ‘doing my job wrong!’ I stayed quiet and later told my supervisor.”

In August, when Zoo Guides were asked if they felt like they had made a difference (Table 4.9), some cited self-improvement with skills they had gained as a Zoo Guide (33.34%):

“I know a lot more than when I first started. I’m a better ‘public speaker’ and it has made me better.”

“I’ve become more comfortable speaking to the public, cooperating with new co-workers.”

When asked if they would return as a Zoo Guide in the future, a few Zoo Guides said they would because of what they gained from the program (26.7%):

“It had been a good experience and I’ve learned a lot along the way and increased the way I learn, etc.”

“I enjoy working at the zoo and almost every day I learn something new.”

Some Zoo Guides, however, said they were not sure if they would return because it could not offer what they need from a job (20.0%):

“I feel like we got treated like we are very young children that can’t do stuff on our own.”

“Depends if a better job comes up.”

Based on Zoo Guides’ responses, the ZooGuides program gave them valuable skills that can be transferred to jobs in the future. However, some Zoo Guides implied they see the program as simply a first job experience that they have chosen to leave behind. Zoo Guides were expected to increase their ability to educate guests as a result of the program. In addition, working on exhibit was expected to have a bigger impact on ability than training. Qualitative results from the supervisors’, new Zoo Guides’, and returning Zoo

Guides' perspectives supported both of these hypotheses. Most of the Zoo Guides were able to gain workplace skills as a result of the program, and were able to strengthen these skills through working on exhibit.

## **CHAPTER 5: DISCUSSION**

### **OVERVIEW**

All five study objectives were evaluated as a result of this study. Results of this evaluation were generally positive, though they did not always follow expectations based on Kolb's Experiential Learning Theory. Results are first discussed in terms of the five research questions, limitations are addressed, implications of the study in terms of future research are discussed, and then recommendations for the Rosamond Gifford Zoo and its ZooGuides program are provided.

### **RESEARCH QUESTION 1: DO ZOO GUIDES INCREASE THEIR BIOLOGICAL KNOWLEDGE AS A RESULT OF THE PROGRAM?**

It was expected that Zoo Guides would increase their biological knowledge as a result of the program. More specifically, I expected they would increase their knowledge after five weeks of training, and then increase their knowledge even more after working on exhibit for four months because they were learning through experience. Both quantitative and qualitative results from the Zoo Guides' perspective supported these expectations. Zoo Guides were given a significant amount of information about biological concepts, the role of modern zoos, and conservation during training. Unfortunately, they were also attending school at the same time, which could have made it difficult for them to focus and a lot of the information. On the other hand, five weeks of 35 hours total is a long period of training time. Some zoo volunteers receive far less training before going out on exhibit (Bixler, et al., 2014). In addition, Zoo Guides were given quizzes frequently during training, encouraging them to make sure they understood the material given.



It is typically expected for students to lose retention of information sometime after material is first taught (Weinstein, et al., 2014; Packer & Ballantyne, 2010; Schultz & Joordens, 2014). However, in the Zoo Guides' case they learned material they would need to use frequently out on exhibit, information they would need to be able to pass on to guests. Zoo Guides were encouraged to teach each guest- to pass along at least one fact. In addition, they had to be prepared to answer questions guests had about the animals and the zoo. If a guest had any questions the Zoo Guides could not answer, Zoo Guides would ask their supervisors or find out the answer on their own so that they would be prepared to answer the same question in the future. Furthermore, some Zoo Guides would do outside research on their own simply because were interested in the zoo's animals. For these reasons, Zoo Guides not only cemented the knowledge they learned during training, but also went above and beyond to become more knowledgeable.

## RESEARCH QUESTION 2: DO ZOO GUIDES INCREASE THEIR INTEREST IN WILDLIFE AND WILDLIFE CONSERVATION AS A RESULT OF THE PROGRAM?

It was expected Zoo Guides would increase their interest in wildlife and wildlife conservation as a result of the program. More specifically I hypothesized they would exhibit increased interest after five weeks of training and then increase their interest even more after four months of working on exhibit. This is because they were exposed to animals every day in their work. Quantitative evidence from Zoo Guides' perspectives does not fully support expectations. Interest levels increased significantly after training, but did not increase significantly after working. Qualitative evidence from Zoo Guides' perspectives suggests they did, however, develop further interest in wildlife and

conservation as a result of the program, but it is unclear whether working contributed more to this than post training.

Much of training time was spent on why multiple levels of biodiversity are important and what makes individual animal species unique and significant. They were also taught about the role of modern zoos in perpetuating species survival and conservation. Finally, they were taught that it is part of their job as ambassadors of the zoo to facilitate connections with wildlife and encourage people to care about conservation. It would be difficult for Zoo Guides to take on this role without also forging connections with wildlife and caring about conservation themselves. It would seem, however, that learning about the animals on exhibit and teaching guests about them did not necessarily prompt more interest towards wildlife. These results do not match findings from other studies, as others have consistently found direct exposure to wildlife resulted in a higher concern, perhaps due to an emotional connection (Olive, 2014; Rosalino & Rosalino, 2012; Staker, 2016; Sanford, 2014; Griffin, et al., 2016; Bixler, et al., 2014; Rozelle & Mackenzie, 2011; Shields & Frederick, 2011; Davidson, et al., 2011). Thus, the results of this research question are puzzling.

One explanation may be that many Zoo Guides entered the program without a particular interest in, or experience with, wildlife. Individuals who enter environmental education programs with more experience tend to have higher knowledge, interest, and attitude outcomes (Kruse & Card, 2004). It is also possible that questions on this study's surveys did not allow Zoo Guides to accurately report higher levels of interest. On the activities checklist, there may have been activities that were not possible for Zoo Guides to complete. For example, Zoo Guides would not have been able to visit a zoo other than

the Rosamond Gifford Zoo if they were not able to leave Syracuse during the Zoo Guides program. On the cause donation checklist, even if Zoo Guides had grown to appreciate biodiversity conservation more than they did, originally, it does not necessarily mean that they would put less importance on education, for example. Education was the only cause to which Zoo Guides consistently donated large amounts of hypothetical money (> \$20). Interestingly, previous research has found that urban adolescent students do not think education is worthwhile (Goodenow & Grady, 1993). Clearly that was not the case with this group of teenagers; with many of them discussing their plans attend college in journals and interviews. Based on qualitative evidence, Zoo Guides did exhibit increased interest in wildlife and wildlife conservation by the end of the program. The larger role of working for four months on the increase cannot be ruled out. It is recommended to modify the instruments used in this study to improve them for future evaluations to facilitate more definitive outcomes for this research question.

### RESEARCH QUESTION 3: DO ZOO GUIDES INCREASE THEIR AWARENESS AND INTEREST IN RELATED CAREERS AS A BYPRODUCT OF BEING A ZOO GUIDE?

Zoo Guides were expected to exhibit increased interest and awareness of wildlife related careers as a byproduct of the ZooGuides program, both after training and then even more after working at exhibits. Quantitative results from Zoo Guides' perspectives partially supported these hypotheses, but the qualitative results did not. Based on surveys, Zoo Guides were not highly interested in wildlife related careers at any point of the program. However, interest did increase significantly after training, though it did not increase further after working. Based on interviews and journals, Zoo Guides enjoyed

working at the zoo and educating guests about wildlife in most cases. However, with exception of one person, Zoo Guides did not imply that the ZooGuides program increased their interest and awareness of wildlife related careers.

It is not part of the ZooGuides program to encourage Zoo Guides to begin wildlife related careers in training or beyond. Zoo Guides are given the skills and knowledge they need to take on the responsibility of a first-time job involving educating guests about wildlife at a zoo. The program also did not select Zoo Guides based on their interest in wildlife or conservation. The program, does, however, claim that Zoo Guides are given skills and exposed to opportunities in STEM professions.

Results indicated career choices were not always affected training or meeting staff with animal related professions at the zoo. Some Zoo Guides entered the program with clear career paths in mind. For example, one senior Zoo Guide wanted to be a chef even after participating in the program the year before and choosing to return. Another senior Zoo Guide similarly planned to join the marines after graduating high school and the ZooGuides program did not change this career path. However, six Zoo Guides listed wildlife related careers on the post-training test and/or the post-program test that they did not on the pre-test. Based on their journals, these individuals enjoyed working at the zoo and educating guests about wildlife. They also stated they would return or wanted to return to the program the following year. Though it cannot be said the program was directly responsible for the increase in interest in wildlife related careers, there was a correlation between higher stated interest and enjoyment of the Zoo Guides program experience.

Interest in wildlife careers did not increase further significantly after working on exhibit. It is possible that simply learning about biodiversity and other biological concepts about animals was enough to ignite interest in animals and that working on exhibit did not encouraged the same level of interest. It is also possible that some individuals were deterred from related careers after working on exhibit. There were two individuals who listed two related careers on the post-training test and only one on the post-program. One of those individuals stated that although he/she loved the program, it did not offer a high enough salary. The other individual did not indicate why he or she might have decreased his or her desire in related careers. This individual did express desire to return to the program. However, he/she previously listed education as a possible career route and did not reiterate this possibility after working. Perhaps the stress of educating so many guests every day deterred this individual from wanting to pursue education in the future.

It is difficult to compare these results to previous studies because young individuals who choose volunteer, intern, and work temporarily within zoos and similar institutions typically do so because they were initially interested in wildlife (Pyatt, et al., 2009; Bixler, et al., 2014; Stevenson & Peterson, 2015). Other research has been conducted on students recruited to participate in camps, educational programming, and professional development without an initial interest, however they were not expected to work or commit service (Kruse & Card, 2004; Bruyere & Teele, 2012; Wiggins & Tingley, 2015; Haluza-Delay, 2001). The ZooGuides program is unique as individuals generally choose to participate because it is paid employment and not necessarily because they are particularly interested in animals. Thus, Zoo Guides do not necessarily enter the

program with the desire to gain more experience towards a wildlife related career, which makes the ZooGuides program unique.

One other factor that may have influenced Zoo Guides' interest and awareness in related careers is ethnicity. Both of the supervisors and the Director of Education during the 2017 program were white. In contrast, only one Zoo Guide during the 2017 program identified as white or Caucasian (Table 4.1). Employees have been shown to have higher satisfaction with managers that share their ethnicity (Giuliano, Levine, & Leonard, 2006). Many of the other Rosamond Gifford Zoo staff members were also white at the time of the 2017 program. Zoo Guides may have had difficulty identifying with the staff members, which could have influenced how they perceived the possibility of a zoo-related career.

#### RESEARCH QUESTION 4: DO ZOO GUIDES INCREASE THEIR ABILITY TO EDUCATE ZOO GUESTS IN AN ENGAGING AND EFFECTIVE WAY?

Zoo Guides were expected to increase their ability to educate guests in an engaging and effective way as a result of the ZooGuides program. More specifically, this was expected to increase after working on exhibit for four months, as they did not interact with guests considerably during training. Both the quantitative results from the Zoo Guides' and the guests' perspectives, and qualitative results from the Zoo Guides' and the supervisors' perspectives partially fulfilled this expectation. Zoo Guides, themselves, indicated they were less confident in their ability to educate guests after training than they were pre-training, but that they had improved after working on exhibit. It is plausible that Zoo Guides ranked their confidence highly on the pre-test because they unaware the position's responsibilities. They also might have been wary of the consequences of their responses since the pre-test was given on their first day of training and there was no time

to develop trust, which is important in obtaining honest responses (Diamond, et al., 2009). After becoming aware of their responsibilities, but perhaps not receiving enough practice, it is possible that Zoo Guides became overwhelmed and were no longer as confident. After working for four months, Zoo Guides indicated higher confidence, likely because they gained more concrete experience educating guests, which follows ELT's expectations. Statistical data from guest observations and interviews generally supported these results. Based on interviews and journals, there was a division between Zoo Guides who better understood their responsibilities and were committed to fulfilling them and Zoo Guides who either were aware of their responsibilities, but did not put in the effort, or did not understand how to better educate guests.

Based on Experiential Learning Theory, it makes sense that Zoo Guides would become better at educating guests with more experience (Kolb, 1984). In addition, new Zoo Guides were often paired with senior Zoo Guides, who served as mentors. This gave Zoo Guides the opportunity not only to learn from their own experiences, but also by observing individuals who are more experienced and confident. Indeed, supervisors noted that new Zoo Guides gained much of their knowledge onsite from senior Zoo Guides.

There are several reasons why some guest observations and interviews may not have yielded results supporting the Zoo Guides' and supervisors' perspectives and ELT. During interviews, it is difficult to obtain unbiased responses without building a sense of safety and trust between the interviewer and the interviewee (Diamond, et al., 2009). Guest interviews had to be done quickly due to the number of guests that needed to be interviewed and, in an effort, to limit time required by each guest. There was no time to build trust and, thus, guests may have feared there would be negative consequences

incurred by the Rosamond Gifford Zoo based on their responses. In the first interview question, every single guest verbally agreed that Zoo Guides seemed confident. Perhaps all guests really did think that the Zoo Guides were confident in their interactions, but they may have also feared the ramifications of declaring that a Zoo Guide was not confident. The latter is far more likely because Zoo Guides were observed to frequently allow guests to pass them by, or occasionally not speak to guests approaching their stations in the beginning of the work season. This behavior was not observed as often in the later part of the work season. Based on these observations, guests' verbal opinions did not accurately reflect Zoo Guides' confidence and skills. In the second interview question, there were guests who admitted that they had not learned anything from Zoo Guides. However, it is important to note that this response was usually followed by an explanation. Guests would go on to say they had not spent enough time talking to the Zoo Guide to learn something, or that even though they did not learn something, their children might have. This clarification was likely preferred to ameliorate whatever consequences the first statement might have had. In the case of the third interview question, it is possible the guest did learn something more advanced, but chose to respond with something simpler in order to save time spent participating in the interview. Also, an earlier study done on guest-volunteer interactions documented that guests often do not continue to think about conversations they have had with zoo staff after they have left the conversation (Mony & Heimlich, 2008).

Guests surveyed through observations generally reflected improvement in Zoo Guides' ability to keep guests engaged. The observations yielded a higher proportion of high guest interest over time, though there was a dip in July. This pattern was also seen in



guest interviews and was corroborated by supervisors citing “summer slump.” Several factors could have explained this. Even if Zoo Guides increased their confidence in attracting guests and keeping them engaged longer, guests are there to see the animals on exhibit and may try to leave Zoo Guides quickly in order to spend more time watching the animals (Davidson, et al., 2009). It should be noted again that I observed many of the Zoo Guides letting guests pass by in the beginning of the working season, though they were much more active in reaching out to guests in July. There were even occasions in July and August in which Zoo Guides could be seen leaving their stations for areas nearby with more guests, so that they could interact with them, which had not been observed in May and June. It is also possible that high engagement interactions occurred while I was making observations in another part of the zoo.

#### RESEARCH QUESTION 5: DO ZOO GUIDES GAIN RELEVANT WORKPLACE SKILLS AS A RESULT OF THE PROGRAM?

Zoo Guides were expected to gain relevant workplace skills as a result of the program. More specifically, they were expected to gain skills after training and to strengthen those skills by using them frequently while working on exhibit. Quantitative results from the Zoo Guides’ perspective partially supported this expectation. Zoo Guides did not feel more comfortable working with other people or talking to groups of people after training, but they did after working on exhibit for four months. They were comfortable talking about conservation, answering zoo related questions, and talking to supervisors before the program started and remained that way throughout the program. They all indicated training helped in interacting with guests equally before working on exhibit and at the end of the program. Lastly, they strongly agreed that skills gained as a

Zoo Guide would help prepare them for future jobs. Qualitative data from the Zoo Guides' perspective through journals and the supervisors' perspectives through interviews also supported research expectations. The Zoo Guides' supervisors described over four months of interviews how Zoo Guides developed tremendously over the course of the program in their ability to work with each other and become more committed to their responsibilities. There were a few individuals who did not put in their best effort, whether they became more knowledgeable in workplace skills or not. Zoo Guides agreed, as well, that they gained valuable skills from the program, especially since the Zoo Guides program was the first job experience for all of them.

It is logical that Zoo Guides would be more comfortable working with other people after working with them for four months. There may have been conflicts between individuals in the beginning of the program because many Zoo Guides were new to each other. However, by the end of the program; conflicts all but disappeared because the Zoo Guides had gotten to know each other better. Similarly, other research has documented volunteers at zoos become friendlier with each other by interacting with each other frequently onsite (Bixler, et al., 2014). It is also logical that the Zoo Guides would become more comfortable talking to groups of people after working on exhibit. Zoo Guides did not spend a considerable amount of time interacting with groups of guests during training. Past research has shown that practice through experience is key to confidence with public speaking (Efird, 2015; Frank, 2006).

What is perplexing is that Zoo Guides did not feel significantly more comfortable talking about conservation and answering zoo related questions at any point in the program. Based on results from surveys, Zoo Guides possessed low levels of biological

knowledge, including conservation topics on the pre-test. Based off of journal responses, Zoo Guides did, indeed, encounter situations in which they could not answer a guest's question when they first started working. It is not surprising that Zoo Guides may not have been honest in answering survey questions on the pre-test. Once again, in order to obtain honest unbiased answers for study participants, it is imperative to build trust between the researcher and the study participant (Diamond, et al., 2009). With this in mind, the pre-test was given to Zoo Guides on their first day of training, before any sort of relationship could be formed between the Zoo Guides and not only the researcher, but also their supervisors. Zoo Guides may not have trusted that there would be no consequences for honest answers. This might also explain why the Zoo Guides claimed they were just as comfortable with their supervisors before the program began as they were after training and at the end of the program. It is also possible Zoo Guides were unaware of their own level of conservation knowledge and ability to answer zoo related questions. However, Likert scale questions were prompted after biological knowledge questions on the survey, and because many Zoo Guides left several biological knowledge questions blank, this seems unlikely.

What is most surprising is that Zoo Guides did not score their comfort in talking about conservation and answering zoo related questions significantly higher after working on exhibit. In their journals, new Zoo Guides described times when they had received compliments, positive reviews from zoo staff, and even thank you letters from guests. This would have served as an acknowledgement of the Zoo Guides' ability to educate others about the zoo. In later journals, they also boasted about how well they were able to answer guests' questions, how much more knowledgeable they were about wildlife, and how well they could educate guests. Based on their journal responses, they did believe they were

more competent in these skills than they were when they first started. Perhaps, the Likert scoring from the pre-test and the post-training test were falsely reported to the extent that they were not a reflection of the true increase by the end of the program.

## LIMITATIONS

There were some limitations of this study. The first stemmed from its duration. The study evaluated the program during its 2017 run. As a result, it focused on only one of the program's cohorts of 20 individuals. The four returning Zoo Guides provided some perspective on the 2016 program and the long-term effects of participating in the program. However, because only one cohort could be studied, statements about the ZooGuides program as a whole cannot be made. There are many external factors that could have influenced Zoo Guides' professional and educational development during the program. In order to account for these external factors, evaluations should be continued in the future for cohorts in other years of the program.

Another limitation of this study was the evaluation of a single program. It is thought that program evaluations are made stronger when they are done on aggregates of comparable programs, as opposed to single site evaluations (Diamond et al., 2009). This study evaluated a singular program at a single site. The ZooGuides program is unique in hiring low- income high school students to educate guests within a zoo. There are no comparable programs in the Syracuse area to which the evaluation could be applied. Future researchers may have the opportunity to conduct a larger-scale evaluation of comparable programs outside of the Syracuse area.

## IMPLICATIONS OF THE EVALUATION STUDY

Results of this evaluation study were generally positive. There were many Zoo Guides who did develop professionally and educationally in some, if not all of the ways addressed in the study's five research questions associated with the ZooGuides program. Unfortunately, there were Zoo Guides who did not increase biological knowledge, interest in wildlife and wildlife conservation, wildlife related careers, ability to educate guests, or gain workplace skills as a result of the program. Despite this, the ZooGuides program can be improved to better serve future Zoo Guides. First, the program served as a first job for all of the individuals who participated as Zoo Guides and many individuals spent every day of the program learning something new about ecology, evolution, animal behavior and many other fields of knowledge. For some individuals, that knowledge transferred over to an interest in wildlife that was not there before, which has led them to consider new career paths in science that they had not considered before. Many Zoo Guides grew in confidence from having to reach out to hundreds of guests that walk by. The Zoo Guides were exposed to co-workers, supervisors, conflicts, and responsibilities in a safe way that will prepare them for the workforce. The program was empowering for all of the Zoo Guides in some way. The study results provide strong support for continuation of the ZooGuides program and hopefully the introduction of similar programs in other zoos.

The study also has implications for Experiential Learning Theory (ELT) and future research. Zoo Guides received concrete experience through interacting with guests onsite for four months. This was successfully examined by testing the effects of training and working separately. The second process of ELT, reflection, was documented successfully through journals and interviews. Zoo Guides discussed what they were learning, what they

thought they did well, what they could improve on, and how the program has impacted their lives. Reflection was also evaluated through Likert scale questions on workplace skills, but this was not completely successful in attaining information on how Zoo Guides improved their skills through reflection. The third process of ELT, abstract conceptualization, was not documented successfully in this study. Zoo Guides did not appear to change their ideas of wildlife in journals or in surveys. A few individuals did discuss how the program changed their views of conservation, but most did not. The fourth process of ELT, active experimentation was documented successfully through guest observations, guest interviews, and supervisor interviews. These methods indicated how Zoo Guides improved their ability to educate guests, improved their responsibility and professionalism, and spent more time learning about the animals on exhibit. They were observed to act differently than they did in the beginning of the work season.

ELT postulates learning through experience results in stronger outcomes. Based on this theory, Zoo Guides were expected to have stronger educational and professional development after working on exhibit for four months than after five weeks of training. This was supported by the Zoo Guides' significant increase in biological knowledge after working. However, ELT also implies that knowledge gained as a result of experience will involve a change in formation of ideas and attitude (Kolb, 1984). In relation to this study, an increase in wildlife knowledge should result in a change in a greater appreciation of wildlife and a more sympathetic attitude toward wildlife conservation, which would also lead to a stronger interest in related careers. However, I did not find this to be the case. Perhaps a program involving more long-term immersion would yield results in stronger support of ELT.

These results also disagree with findings from other studies that provided evidence for experience leading to increased intellectual and emotional involvement (Olive, 2014; Rosalino & Rosalino, 2012; Staker, 2016; Sanford, 2014; Griffin, et al., 2016; Bixler, et al., 2014; Rozelle & Mackenzie, 2011; Shields & Frederick, 2011; Davidson, et al., 2011). Further research should be done on the types of experiences leading to increased interest and attitude change, as that could be a factor in my documenting different results. As this is one of the few studies been done on the development of a young person working as an informal science educator for the first time, more studies should to be done in order to increase our understanding of the effects.

## EVALUATION RECOMMENDATIONS

Even though the evaluation yielded generally positive findings, there were also areas of the ZooGuides program that could benefit from improvement. The evaluation design, itself, could also be improved, including instrument revisions, for use in future evaluations.

### *Introducing More Independence*

The ZooGuides program is the first job experience for every new Zoo Guide hired. The Zoo Guides experience having supervisors, co-workers, and interacting with many different strangers every day. These are all new experiences for them, and they need guidance when they first begin. However, by the end of the program, Zoo Guides will have had experiences with each other from March through August (almost six months), and so then they are familiar with each other and their supervisors. Plus, they have experience interacting with the public for four months. At that point, they no longer needed as much guidance as they had in the beginning of the program. In fact, journals

indicate they need to experience more independence. In the August journal (Table 4.9), one Zoo Guide commented program supervisors treat Zoo Guides in a patronizing way:

“I feel like we got treated like we are very young children that can’t do stuff on our own.”

Even in the last week of August, the supervisors circled the zoo every hour in order to check on each Zoo Guide. The supervisors were making sure Zoo Guides were actively engaging guests, were not on their cell phones, or sitting. While it is important for Zoo Guides to know they should be actively engaging guests and representing the zoo well, it may also be beneficial for them to gradually be trusted to maintain their responsibilities on their own. This would give them valuable workplace experience, as they would learn self-instruction, which is a valuable part of competency (Umholtz, 2013).

### *Introducing More Responsibility*

After training from March through May, Zoo Guides primarily did the same activity every day they worked. They would pick an exhibit, perhaps with a partner or by themselves, bring relevant biofacts, and interact with guests for a couple hours. They were given a lunch break, and then chose a different exhibit to work from for a couple hours. Occasionally, there were events, in which Zoo Guides were given different activities, such as crafts. Zoo Guides also occasionally went on field trips. They are also typically given the opportunity to lead a tour, however this did not occur during the 2017 program. The senior Zoo Guides are given more responsibilities in mentoring new Zoo Guides. However, there was not much variability throughout the program. This may be why a few



Zoo Guides became less committed towards the end of the program and put in less effort or stopped coming in to work.

One improvement that could be made is introducing more responsibilities to Zoo Guides as the program goes on. For example, Zoo Guides could be given a project to work on towards the end of the program and then given an opportunity to present in August. Some possible projects include research projects on animal behavior, designing new biofacts that could be used at stations, or creating an interpretive video podcast on one of the zoo's animals. Various zoo staff, such as education staff, zookeepers, and curators could serve as mentors on these projects. These projects would introduce variation in the workday and reinforce Zoo Guides' commitment towards the end of the program. This would also encourage Zoo Guides to gain more knowledge outside of what they have learned during training, and provide more exposure to careers at the zoo. These types of projects were previously given to a small group of Zoo Guides who wished to continue on in the winter, however they have never been implemented for the core summer program so that all 20 Zoo Guides could participate, and the winter portion was cut from the program in 2016. The ZooGuides program is a unique type of experience that the Zoo Guides may not receive again and so it is important to make it enriching and meaningful.

### *Moving Beyond Facts*

One emergent theme that was documented in journals, supervisor interviews, and guest interviews is the emphasis on facts. Zoo Guides were told repeatedly that guests need to leave each station having learned least one fact. Zoo Guides were nervous on their first day, as they were not sure if they would remember enough information correctly in order pass on that information to guests. Later in the program, Zoo Guides were most

proud of themselves for giving guests a lot of information or facts. It was evident from guest interviews that Zoo Guides fixated on one or two facts they learned about each animal and relayed those to guests. During guest interviews, when guests were asked what they learned, they all responded with the same pieces of information. At the tiger exhibit, many guests responded that they had learned what tiger fur feels like or what the tiger's paws are used for. There were multiple responses with those same facts. The same phenomenon occurred at other stations. Supervisors also talked about how Zoo Guides got better at hooking guests as the program progressed. What happens after the guest is hooked and has learned a fact? Guests may be learning something new, but in order to be engaged and provoked, Zoo Guides need to allow guests to form a connection with the information and the animal subject (Idema & Patrick, 2016; Roe, et al. 2015; Mony & Heimlich, 2008).

Learning how to hook guests with facts is a good starting point for Zoo Guides. However, as the program progresses, Zoo Guides should learn about more interpretive methods they can use at their stations. Giving the Zoo Guides more interpretation training during the working season, as professional development, should be considered. It might also be beneficial for Zoo Guides to practice more with each other, e.g. through practicing public speaking skills, in preparation for interacting with guests. Zoo Guides can learn how to gauge guests' knowledge and interest levels in order to convey information about animals more effectively and also how to build connections between the animals and the guests' lives. Zoo Guides should also gradually focus on key messages, as the AZA puts emphasis on conservation and animal welfare message communication (Patrick, et al., 2010; Marino, et al., 2010; Roe & McConney, 2015). This would empower Zoo Guides to

become stronger educators and enhance guests' experiences. This might also keep Zoo Guides more engaged so that they are not repetitively regurgitating information hundreds of times a day.

### *Revising Evaluation Methods*

This evaluation was done, in part, because the ZooGuides program had never been formally evaluated previously. The study was done in hopes that the Rosamond Gifford Zoo could not only use the study's results to improve the program, but also use the study's methods in their own evaluations. All of the methods and instruments used in this study were carefully thought out to provide the most meaningful resources for the Rosamond Gifford Zoo. Some of these methods were effective and others were not effective in obtaining useful information about the ZooGuides program.

It would be beneficial to repeat many steps of this study in future evaluations. The study sought to understand the Zoo Guides' experiences as part of the ZooGuides program. It would be important to be clear about this in interactions with Zoo Guides, starting from introductions on the first day of training. A rapport was established with Zoo Guides by my continuing to interact with them in a non-formal way through training sessions and during the work season. As a result, I was able to obtain honest responses from Zoo Guides about all aspects of their experiences, positive and negative. It was also helpful to provide a sense of privacy for both supervisors and Zoo Guides when they were interviewed.

In order to obtain a realistic perspective of the Zoo Guides' knowledge, interest, and abilities, it was beneficial to use a triangulation of methods. The Zoo Guides', supervisors', and guests' perspectives were examined to address research questions. This

was important because different perspectives yielded more realistic results depending on the research question. For example, there was no significant difference in comfort for many of the relevant workplace skills between the surveys. However, according to supervisors and interactions between Zoo Guides and guests, the Zoo Guides improved their professionalism and confidence throughout the work season. Triangulation also resulted from evaluative instruments. Quantitative data was collected using surveys, observations, and interviews. Qualitative data was collected using journals and interviews. Having both a quantitative and a qualitative perspective created a fuller picture to address each research question. For example, the Zoo Guides may not have been able to effectively express their interest in wildlife through the quantitative questions on the surveys, but were able to better do so through the qualitative questions in their journals. It would be useful for future evaluations to incorporate a similar triangulation of methods.

Many of the methods used in this study should also be improved for future evaluations. While it is valuable to have a triangulation of both quantitative and qualitative results, improvements can be made so that both types of methods yield realistic perspectives and useful information. For example, the quantitative results did not find a significant increase in relevant workplace skills, while the qualitative results did. Perhaps further questions could be added to guest interviews to gather more information on interactions with Zoo Guides. The questions on survey tests could be altered to better assess interest in wildlife conservation and comfort with workplace skills. For example, instead of giving the Zoo Guides a hypothetical \$100 to donate to causes, Zoo Guides could be asked to rank the causes. This might be a better way to assess their interest because as teenagers with a minimum wage job, it is possible that this question was not

applicable to their lives (i.e. what is \$100 to a teenager?). It may also be useful to interview new Zoo Guides similarly to returning Zoo Guides, which would allow for elaboration on the types of responses given in journals. These changes may result in improvements necessary to obtain more useful information from the evaluation instruments and design.

### *Define Goals, Objectives, and Expected Outcomes*

The goal of this study was to evaluate the Rosamond Gifford Zoo ZooGuides program; however, it was not a true evaluation as it did not address the goals, objectives, and expected outcomes as defined by the zoo. This is because the Rosamond Gifford Zoo has not explicitly defined these components of the program. Strong evaluations identify whether programs are meeting their objectives and whether they match the organization's mission (Vos, 2001; Diamond, et al., 2009; Carlton-Hug & Hug, 2010). Identifying these program components will enable the zoo to make any future evaluations more useful.

Once the Rosamond Gifford Zoo defines clear program goals and objectives that align with the zoo's mission, the zoo can create a logic model. Vos (2001) makes the argument that logic models are one of the most valuable tools in program evaluation. She posits that inputs explain investments that are made for the program to run, outputs explain services rendered by the program, and outcomes explain both the positive and negative consequences of the program. More elaborate models may also summarize the situation and environment to provide context for the program, as well as assumptions held about the program. These models provide an easily digestible representation of any program's analysis. An example of how the Rosamond Gifford Zoo might arrange a logic model for the ZooGuides program is provided below (Fig. 5):

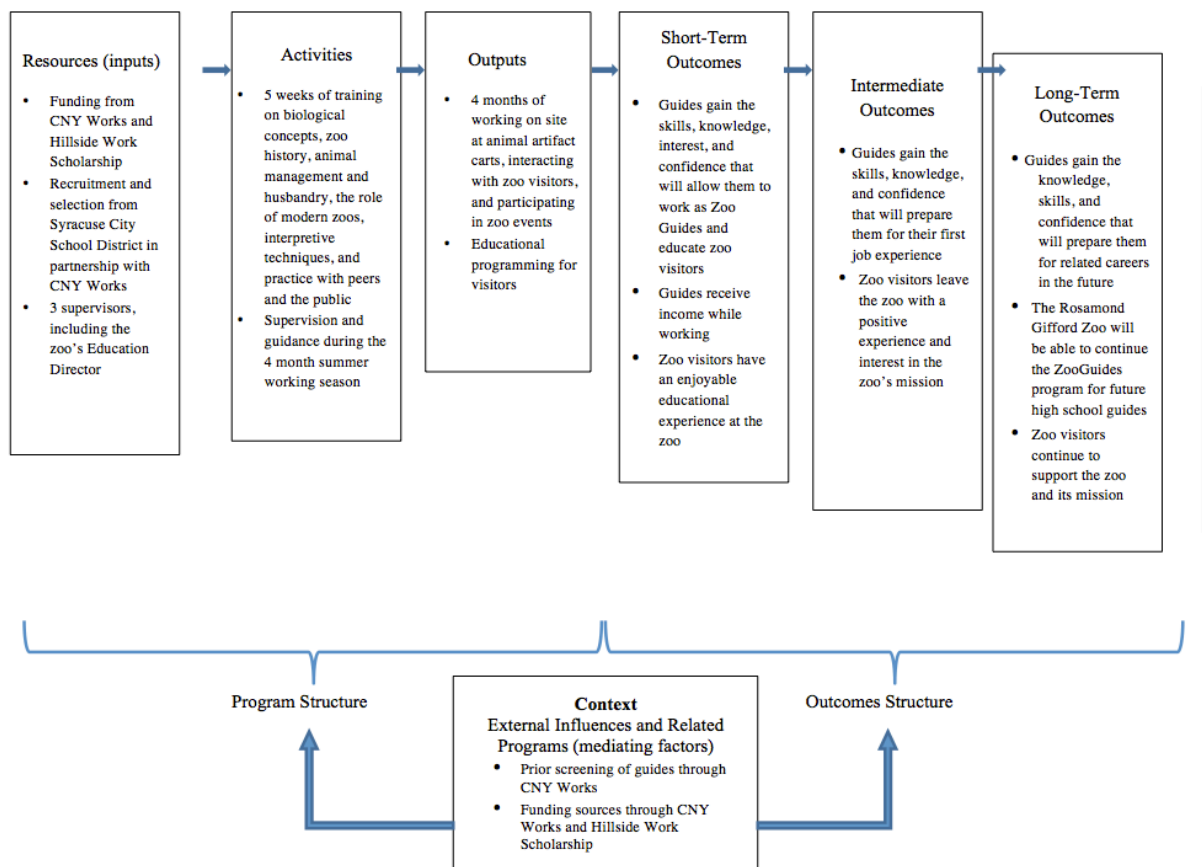


Figure 5.1: Logic model of Rosamond Gifford Zoo's ZooGuides Program.

## CHAPTER 6: CONCLUSION

Zoo education is a burgeoning field of study with many gaps needing attention. One of these gaps is the education of young zoo educators, such as volunteers, and paid or unpaid interns. The ZooGuides program served as an opportunity to study these young individuals because Zoo Guides are not hired based on their interest in animals or wildlife conservation and the program serves as their first job experience. The ZooGuides program was evaluated with five research questions:

- Do Zoo Guides increase their wildlife knowledge as a result of the program?
- Do Zoo Guides increase their interest in wildlife and wildlife conservation as a result of the program?
- Do Zoo Guides increase their awareness and interest in related careers as a byproduct of being a zoo guide?
- Do Zoo Guides increase their ability to educate guests in an engaging and effective way?
- Do Zoo Guides gain relevant workplace skills as a result of the program?

After conducting an evaluation over the course of the 2017 program from March through August, these questions were answered with both quantitative and qualitative data. Zoo Guides were expected to increase wildlife knowledge, wildlife interest, related career interest, ability to educate guests, and gain relevant workplace skills as a result of the program. They especially were expected to excel in all of the categories after working on exhibit for four months as they were gaining more direct experience. I did find Zoo Guides increase their wildlife knowledge as a result of the program. However, they do not necessarily increase their interest in wildlife or related careers after working, which did not align with expectations. Zoo Guides were able to increase their ability to educate guests, but they could become stronger educators with improvements in the program. Lastly, Zoo Guides increased relevant workplace skills according to qualitative data, but

not quantitative data, likely a result of needed improvements in instrument design.

Despite shortfalls in some areas, and that improvements can be made in some areas, the program proved to be a positive and constructive experience for all of the participating Zoo Guides, and this study provides strong support for its continuation.



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## APPENDICES

### APPENDIX A: SURVEY PRE-TEST

Birth year and first 3 letters of your last name\_\_\_\_\_

**Part 1:** Please answer to the best of your ability. Your answers will not affect your position as a zoo guide.

- 1. How do zoos contribute to worldwide conservation efforts?**
  
- 2. What is a Species Survival Plan (SSP)?**
  
- 3. Complete the chart below listing each class of animal, and a common characteristic which that class shares (note that there are always exceptions to these rules!). The first is done for you.**

Class	Common Characteristic (there are always exceptions)
1. Fish	Are covered with scales
2.	
3.	
4.	
5.	
6.	

4. Complete the chart below listing some of the Earth's biomes, and a common characteristic which that biome shares. The first is done for you.

Biome type	Common characteristic
1. Desert	Very low rainfall
2.	
3.	
4.	
5.	

5. What is an animal adaptation? Can you give an example?

6. A) What is biodiversity?

- a) Number of individuals in a population
- b) Number of species in a community or ecosystem
- c) Genetic diversity of a population
- d) Number of different types of habitats in an ecosystem



**B) Why is biodiversity important?**

**7. A) What is an endangered species?**

- a) A species likely to become threatened
- b) A species likely to pose as a threat to other species where it has been introduced
- c) A species at risk of extinction in part of its range or all of its range
- d) Any species with a small population

**B) Can you give an example of an endangered species?**

**8. Can you give an example of why a species could become endangered?**

**Part 2:**

A. Please place a check mark next to any of the following activities you have done in the **past year**:

Activity	I have done this in the <b>past year</b>
Watched wildlife	
Studied wildlife	
Tried to photograph wildlife	
Went to a zoo (other than for this program)	
Avoided personal contact with wildlife	
Watched a tv show or film about wildlife	
Read a book about wildlife	
Visited a nature center	
Took care of a pet (mine or someone else's)	
Talked about wildlife conservation with others	
Actively conserved water	
Took the bus or carpooled	
Visited a city park	

B. If you had \$100 to donate to the following causes, how would you divide the money? Or would you donate all of the money to one of the causes? List the amount of money out of the \$100 you would give to each cause in the space provided.

**Education**                 \$ \_\_\_\_\_

**Health Care**             \$ \_\_\_\_\_

**Social Justice**           \$ \_\_\_\_\_

(Defined by the United Nations as being similar to **human rights**)

**Biodiversity Loss**      \$ \_\_\_\_\_

**Clean Water**            \$ \_\_\_\_\_

**Part 3:**

What are 3 careers you are most interested in pursuing?

**Part 4:**

A. Circle a number 1-6, with 6 correlating with the most agreement with the statement and 1 correlating with the least

	<i>Least</i>					<i>Most</i>
I am comfortable working with other people	1	2	3	4	5	6
I am comfortable talking about conservation	1	2	3	4	5	6
I am comfortable talking to my superiors	1	2	3	4	5	6
I am confident in my ability to talk to groups of people	1	2	3	4	5	6
I am comfortable answering zoo related questions	1	2	3	4	5	6

B. How do you feel about your ability to educate visitors? Circle the best response.

Very confident      Somewhat confident      Low confidence      Not confident

**Gender** (please circle one):    Male      Female      Other      I choose not to respond

**Age** \_\_\_\_\_

**Ethnicity** (check all that apply):

**White/ Caucasian**      \_\_\_\_\_

**Black/ African American**      \_\_\_\_\_

**Asian**      \_\_\_\_\_

**Latino**      \_\_\_\_\_

**Other**      \_\_\_\_\_

**I choose not to respond**      \_\_\_\_\_

**Do you consider your neighborhood** (circle best answer):

Rural

Suburban

Urban

Thank you for participating!

## APPENDIX B: SURVEY POST-TRAINING TEST

Birth year and first 3 letters of your last name\_\_\_\_\_

**Part 1:** Please answer to the best of your ability. Your answers will not affect your position as a zoo guide.

### **3. How do zoos contribute to worldwide conservation efforts?**

**2. Complete the chart below listing each class of animal, and a common characteristic that class shares (note that there are always exceptions to these rules!).**

**The first is done for you.**

<b>Class</b>	<b>Common Characteristic (there are always exceptions)</b>
1. Fish	Are covered with scales
2.	
3.	
4.	
5.	
6.	

**3. What is an animal adaptation? Can you give an example**

**4. A) What is an endangered species?**

- e) A species likely to become threatened
- f) A species likely to pose as a threat to other species where it has been introduced
- g) A species at risk of extinction in part of its range or all of its range
- h) Any species with a small population

**B) Can you give an example of an endangered species?**

**Part 2:**

A. Please place a check mark next to any of the following activities you have done in the  
**past year:**

Activity	I have done this in the <b>last five weeks</b>
Watched wildlife	
Studied wildlife	
Tried to photograph wildlife	
Went to a zoo (other than for this program)	
Avoided personal contact with wildlife	
Watched a tv show or film about wildlife	
Read a book about wildlife	
Visited a nature center	
Took care of a pet (mine or someone else's)	
Talked about wildlife conservation with others	
Actively conserved water	
Took the bus or carpooled	
Visited a city park	

B. If you had \$100 to donate to the following causes, how would you divide the money? Or would you donate all of the money to one of the causes? List the amount of money out of the \$100 you would give to each cause in the space provided.

**Education**                      \$\_\_\_\_\_

**Health Care**                      \$\_\_\_\_\_

**Social Justice**                      \$\_\_\_\_\_

(Defined by the United Nations as being similar to **human rights**)

**Biodiversity Loss**                      \$\_\_\_\_\_

**Clean Water**                      \$\_\_\_\_\_

**Part 3:**

What are 3 careers you are most interested in pursuing?



**Part 4:**

A. Circle a number 1-6, with 6 correlating with the most agreement with the statement and 1 correlating with the least

	<i>Least</i>					<i>Most</i>
I am comfortable working with other people	1	2	3	4	5	6
I am comfortable talking about conservation	1	2	3	4	5	6
I am comfortable talking to my superiors	1	2	3	4	5	6
I am confident in my ability to talk to groups of people	1	2	3	4	5	6
I am comfortable answering zoo related questions	1	2	3	4	5	6
Training has prepared me to interact with visitors	1	2	3	4	5	6

B. How do you feel about your ability to educate visitors? Circle the best response.

Very confident      Somewhat confident      Low confidence      Not confident

## APPENDIX C: SURVEY POST-PROGRAM TEST

Birth year and first 3 letters of your last name \_\_\_\_\_

**Part 1:** Please answer to the best of your ability. Your answers will not affect your position as a zoo guide.

### 4. What is a Species Survival Plan (SSP)?

2. Complete the chart below listing some of the Earth's biomes, and a common characteristic which that biome shares. The first is done for you.

Biome type	Common characteristic
1. Desert	Very low rainfall
2.	
3.	
4.	
5.	

**3. A) What is biodiversity?**

- e) Number of individuals in a population
- f) Number of species in a community or ecosystem
- g) Genetic diversity of a population
- h) Number of different types of habitats in an ecosystem

**B) Why is biodiversity important?**

**4. Can you give an example of why a species could become endangered?**

**Part 2:**

A. Please place a check mark next to any of the following activities you have done in the **past 4 months:**

Activity	I have done this in the <b>past 4 months</b>
Watched wildlife	
Studied wildlife	
Tried to photograph wildlife	
Went to a zoo (other than for this program)	
Avoided personal contact with wildlife	
Watched a tv show or film about wildlife	
Read a book about wildlife	
Visited a nature center	
Took care of a pet (mine or someone else's)	
Talked about wildlife conservation with others	
Actively conserved water	
Took the bus or carpooled	
Visited a city park	

B. If you had \$100 to donate to the following causes, how would you divide the money? Or would you donate all of the money to one of the causes? List the amount of money out of the \$100 you would give to each cause in the space provided.

**Education**                      \$ \_\_\_\_\_

**Health Care**           \$\_\_\_\_\_

**Social Justice**       \$\_\_\_\_\_

(Defined by the United Nations as being similar to **human rights**)

**Biodiversity Loss**    \$\_\_\_\_\_

**Clean Water**         \$\_\_\_\_\_

**Part 3:**

What are 3 careers you are most interested in pursuing?

**Part 4:**

- A. Circle a number 1-6, with 6 correlating with the most agreement with the statement and 1 correlating with the least

	<i>Least</i>					<i>Most</i>
I am comfortable working with other people	1	2	3	4	5	6
I am comfortable talking about conservation	1	2	3	4	5	6
I am comfortable talking to my superiors	1	2	3	4	5	6
I am confident in my ability to talk to groups of people	1	2	3	4	5	6
I am comfortable answering zoo related questions	1	2	3	4	5	6
Training has prepared me to interact with visitors	1	2	3	4	5	6
The skills I have gained as a zoo guide will better prepare me for other jobs in the future	1	2	3	4	5	6

B. How do you feel about your ability to educate visitors? Circle the best response.

Very confident    Somewhat confident    Low confidence    Not confident

Thank you for participating!

## APPENDIX D: NEW ZOO GUIDE JOURNAL QUESTIONS

Birth year and first 3 letters of your last name\_\_\_\_\_

### **Journal 1: May**

How would you describe your experience on your first day working as a guide?

Was there ever a situation in which you didn't know how to answer a visitor's question?

How did you handle this situation?

Birth year and first 3 digits of your last name \_\_\_\_\_

**Journal 2: June**

Which station is your favorite to work from? Why?

Describe a part (or parts) of being a guide you think you could improve on:



Birth Year and first 3 digits of your last name: \_\_\_\_\_

**Journal 3: July**

Describe a moment when you felt you did your best as a guide:

Have you encountered any conflicts with your fellow guides or supervisors? How did you handle this conflict?

Birth year and first 3 digits of your last name \_\_\_\_\_

**Journal 4: August**

Do you feel like you've made a difference as a guide? Why or why not?

Would you return as a guide next year? Why or why not?

## APPENDIX E: RETURNING ZOO GUIDE INTERVIEW QUESTIONS

How old are you?

Why did you decide to return as a guide?

What was your experience your first year as a guide?

How has your life changed as a result of being a guide?

Do you feel more prepared for other jobs in the future as a result of being a guide?

## APPENDIX F: GUEST INTERVIEW QUESTIONS

1. Did the zoo guides you talked to seem confident?
2. Did you learn anything from talking to the zoo guides? If so, can you describe something you learned?

## APPENDIX G: SUPERVISOR INTERVIEW QUESTION

1. How would you describe the zoo guides' current ability to effectively educate engage with visitors and work together?

## APPENDIX H: BIOLOGICAL KNOWLEDGE SURVEY RESPONSE RUBRIC

1. How do zoos contribute to worldwide conservation efforts?

*1 pt.* mentions endangered species

*1 pt.* mentions the Association of Zoos and Aquariums (AZA), or an AZA conservation program, such as Species Survival Program (SSP) or Save Animals From Extinction (SAFE)

*1 pt.* mentions captive breeding

2. What is a Species Survival Plan (SSP)?

*1 pt.* mentions captive breeding and or reintroduction

*1 pt.* mentions education

*1 pt.* mentions research

3. Complete the chart below listing each class of animal...

*5 pt.* gives a real phylogenetic group of animals

*5 pt.* gives an example of a real characteristic that the phylogenetic group has in common

4. Complete the chart below listing some of the Earth's biomes...

*1 pt.* gives a real example including:

Marine (saltwater) aquatic

Freshwater aquatic

Tropical rainforest

Deciduous forest

Coniferous/boreal forest (taiga)

Desert

Grassland

Tundra

*1 pt.* provides a reasonable characteristic that could be associated with the given biome

5. What is an animal adaptation? Can you give an example?

*1 pt.* mentions elements of evolution, such as natural selection and variation

*1 pt.* mentions characteristics in relation to an environment

*1 pt.* gives a realistic example

6. What is biodiversity? Why is it important?

*1 pt.* correct answer: E

*1 pt.* mentions stability of ecosystems in relation to biodiversity

7. What is an endangered species? Can you give an example?

*1 pt.* correct answer: C

*1 pt.* gives a real life example of a species that is or was endangered

8. Can you give an example of why a species could become endangered?

*2.5 pt.* provides a realistic threat to a species or population

*2.5 pt.* explains how the threat could lead to threatened or endangered species

status

# APPENDIX I: GUEST INTERVIEW RESPONSE CODEBOOK

Learning Category	Qualifier	Responses
<b>Basic</b>	Animal's position	"Where the wolves are", "Learned where the tigers went", "Where the tigers are", "Where the bear is", "They told me where I can find the lion", "We just asked them where the elephants are", "Where the animals were", "Where the snow leopards are", "Where the snow leopard went", "Where the other elephants are"
	Animal's birthday	"It's the elephant's birthday", "They're keeping her from the other elephants because it's her birthday"
	Number of animals in enclosure	"There are two wolves"
<b>Intermediate</b>	Animal's size	"How large elephant skulls are", "The length of the tiger", "I didn't realize how large tigers are," "The kids learned about how big tigers are", "How big the tigers get", "How big the tigers are"
	Anatomical information	"The fur was taken from an animal that died of natural causes", "Learned about scales, you can't take water away", "They didn't kill the animal to get the fur", "Tiger fur is oily," "Tiger fur is soft", "The tail is the length of the tiger", "What the tiger's fur feels like", "The tail can tell you how long the tiger is", "Female asian elephants don't have tusks", "The red pandas use their tails to keep them warm in the wild", "The tiger fur was taken from an animal that died naturally", "The red panda's fur keeps them warm in the wild", "Only male asian elephants have tusks", "The elephant's trunk is



<b>Learning Category</b>	<b>Qualifier</b>	<b>Responses</b>
		like another arm", "The snow leopard's fur helps them camouflage"
	Behavioral information	"They use their front paw to grab stuff", "How they use their paws", "Treats are hidden for the bears to find", "The tigers use their front paws to catch prey", "The bear is good at climbing", "The tigers like to be alone", "The tigers use their front paws to hunt", "The tigers hunt with their front paws", "How tigers hunt"
	Natural history	"Didn't know how much all dogs are related to wolves", "Wolves are related to dogs", "What bears eat", "About claws and treats", "The different kinds of sloths", "The tiger's claws are like other cats", "The red panda isn't actually related to pandas", "Where red pandas live in the wild", "Where snow leopards are found in the wild", "He learned about how to find fossils", "Snow leopards live in the mountains", "How old the elephant is"
	First level conservation	"They were in the US, now they're not", "The wolves aren't found in the US anymore", "There are materials that are similar to elephant tusks", "There are materials that can be used instead of ivory", "People use tiger parts as medicine", "Some tiger parts are used for medicine"
<b>Advanced</b>	Higher level conservation	"Elephants are killed for their tusks", "Ivory can be copied so elephants won't be hunted as much", "Elephants are hunted for their tusks", "Elephants are hunted because people hunt them for their tusks", "Tigers are going extinct, but the zoo is helping protect them", "Tiger parts are used for medicine, which

Learning Category	Qualifier	Responses
		is why people hunt them", "Why tigers are going extinct"
	Higher level behavior	"Tigers hide and camouflage themselves to hunt", "It's difficult to find the tigers because they hide to hunt in the wild", "Tigers have large paws for hunting"

## APPENDIX J: GUEST OBSERVATION CODEBOOK

<b>Engagement Category</b>	<b>Behavior</b>
<b>Disinterest</b>	Looking away Running away Not responding
<b>Low</b>	Touching Eye contact
<b>Medium</b>	Smiling Nodding Pointing Laughing Imitation
<b>High</b>	Engaging others Talking to each other Exclamations Asking questions

APPENDIX K: NEW ZOO GUIDE JOURNAL RESPONSE CODEBOOK

May	
How would you describe your first day working as a guide?	
Key Theme or Phrase	Response
<b>Fear</b>	<p>"It was scary because I thought that I would give false information out or not know anything at all. "</p> <p>"It was hard."</p> <p>I was nervous but I tried my hardest to not show it. I tried my hardest to remember the information of the animal I was doing."</p> <p>"My experience on my first day working as a zoo guide was very scary."</p> <p>"I would say it was nerve wracking because people were staring at me while I was working but at the same time I know they didn't have to stay if they don't want to."</p> <p>"Nervous"</p> <p>"I was scared yes, but got over it."</p> <p>"I was a little nervous but I got used to it and studied a lot from training."</p> <p>"First day was a bit nervous."</p>
<b>Joy/excitement</b>	<p>"Exciting, fun, curious."</p> <p>"Fun!!! My first experience was fun because me and my co-workers got along. Also everything is very interesting."</p> <p>"Excited."</p> <p>"My first day as a zoo guide was fun. It was entertaining an there was never not something to do."</p> <p>"It was fun I learned a lot on the first day."</p> <p>"Very fun! There were a lot of people here, and they were very interested in the facts I told them about the animals."</p>
<b>Confusion</b>	<p>"Working my first day was very difficult and easy cause I was learning new things."</p> <p>"I didn't know what to expect, things was moving fast."</p>

<b>Was there ever a situation in which you didn't know how to answer a question? How did you handle this question?</b>	
<b>Key Theme or Phrase</b>	<b>Response</b>
<b>"I don't know, but I'll find out"</b>	<p>"Yes, I told them I didn't know and would ask them when I get the answer."</p> <p>"Yes, I told him that I didn't want to give the false information and gave them an email so they can send the question and get a response with the answer."</p> <p>"I told them I'll find that out for them."</p> <p>"Yes, I told them I am not sure and I that I can get back to them when I knew the answer."</p> <p>"Yes, I told them I don't have an answer but I'll look into it, just leave the information I can contact you at."</p> <p>"Yeah, there was and I handled it by telling them I didn't know and told them I'll tell them and they gave me their info."</p> <p>"Yes I asked Nate when I saw him."</p> <p>"Yes, I told them I could ask my supervisor. So once I saw Pam, I asked her, and got back to the customer the same day."</p> <p>"Yes, I would say that they can give me their email and when I figure out the answer I will email them it."</p> <p>"Yes, one person asked if there was any events going, so I went to look for my manager and asked."</p> <p>"Yes, some visitors asked about a show time and I didn't know so I asked Pam or Heidi."</p>
<b>No</b>	"No."
<b>"I don't know"</b>	<p>"I simply said 'I don't know'."</p> <p>"Yes and I just told them I didn't know or I asked Heidi."</p>

<b>June</b>	
<b>Which station is your favorite to work from? Why?</b>	
<b>Key Theme or Phrase</b>	<b>Response</b>
<b>Tiger</b>	Tiger
<b>Elephant</b>	Elephant
<b>Bear</b>	Bear
<b>Lion</b>	Lion
<b>Cool information</b>	"It's my favorite because you get to give out cool information"
<b>Surprise people</b>	"...see the expressions on the kids faces of how hey never seen or felt a tiger's paw or pelt." "I like to teach people and surprise them of the details of the tiger." "I love the expression on the visitors faces when I tell them how long it takes a lion to chew through a boomer ball."
<b>Adoration</b>	"I just love elephants, I think they're very gentle and beautiful, I would like to raise awareness about how endangered they are." "...because they love to eat jellybeans, they are very cute."
<b>Exciting</b>	"...its exciting to touch the fur." "...it is very fun"
<b>Know</b>	"I know more about them." "I know the most about our elephants here at the zoo." "I know facts about this animal the most." "...that's where I know the most information for." "I know more information on."
<b>Interesting</b>	"I find it fascinating that they could destroy a ball within 30 minutes." "I would say the bears because they have very interesting biofacts and history."

<b>Describe part (or parts) of being a zoo guide you think you could improve on.</b>	
<b>Key Theme or Phrase</b>	<b>Response</b>
<b>Talking more</b>	"I can speak more." "Talking more." "Talking to the visitors and come on the day that I work on." "I could improve on giving out more information and also talking more."
<b>Engaging</b>	"Part I can improve on is getting more people to come to the stations and be entertained by them." "Maybe getting to the information quicker and trying to keep their interest." "I want to improve on looking more entertaining and calling people over to come to my cart." "...engaging with the people and kids."
<b>Learn</b>	"To learn more info about animals." "I could possibly improve on learning more facts about the monkeys. I know a few, but I could be stronger I that field." "Know more info on all the station"
<b>Shyness</b>	"Speaking more louder so people can hear me more." "Speaking up more and trying not to be at shy." "Shyness."

<b>July</b>	
<b>Describe a moment when you felt you did your best as a guide.</b>	
<b>Key Theme or Phrase</b>	<b>Response</b>
<b>Alone</b>	<p>"I chose to do Ocelot and I was the only guide to do it for that day, but instead going to ocelot I went to the clouded leopard not knowing."</p> <p>"The moment that felt I did my best was when I did the elephant cart I did by myself."</p>
<b>Information</b>	<p>"I got lots of information to visitors and they asked a lot of questions, the total was 800 for only 3 hours."</p> <p>"I gave out accurate information and the guests learned new things."</p> <p>"When I was at lion a customers was asking about peacocks."</p> <p>"When was giving them the right information for elephants."</p> <p>"When I was working with the horns and antlers giving out information "</p> <p>"When I was working at the snake group of kids came over and I gave the information I know."</p> <p>"I did a good job when I had to work with zoo camp. The kids understood me very good and they did a nice job also."</p> <p>"The best moment that I did best at was working with the snakes, I had a lot of information about them and could answer questions I had he answers to."</p> <p>"Speaking out more to give more information."</p>
<b>A lot of people</b>	<p>"The time I felt I did my best as a guide was when I was at snow leopard and there was a big group of people..."</p> <p>"...to a lot of people who did not know about them."</p>
<b>Thank</b>	<p>"...they thanked me."</p> <p>"...I worked with two very smart young girls taught them what I do at my job. They were very fun to work with and I even received a thank you letter from their father."</p> <p>"The day I was working with Adara at snakes and we didn't know that the lady was a zookeeper and she gave us a compliment for doing our job."</p> <p>"When I got a compliment from a zoo guest and they told Pam and Heidi."</p>
<b>First time</b>	<p>"When I did bison for the first time."</p>



<b>Have you encountered any conflicts with your fellow guides or supervisors? How did you handle this conflict?</b>	
<b>Key Theme or Phrase</b>	<b>Response</b>
<b>No</b>	<p>"I actually haven't had any conflicts with other guides but if I happen to do so I would handle it in the most professional way."</p> <p>"No I did not. I work well with all the zoo guides."</p> <p>"No."</p> <p>"I did not encounter any conflict with anyone."</p> <p>"Nope!"</p> <p>"I never had any conflict with none of a supervisor or guides."</p>
<b>Yes, but forgot</b>	"I don't handle it well because one of my fellow guides forces me to get in conflict but I gone throw it and now I don't even remember"
<b>Physical altercation</b>	"Yes I got in trouble for confronting a fellow guide for smacking my hat off of my head."
<b>Talking</b>	<p>"Yes and I would talk to one of the zoo guides that I work with."</p> <p>"Only one conflict... I stayed quiet and later told my supervisor."</p>

<b>August</b>	
<b>Do you feel like you've made a difference as a guide? Why or why not?</b>	
<b>Key Theme or Phrase</b>	<b>Response</b>
<b>Educate others</b>	<p>"Yes because I have taught over 100 people something new every day."</p> <p>"Yes, because I know that I am able to educate the visitors here in ways that may convince them to take steps to better our environment."</p> <p>"Yes because I taught people stuff that they didn't know."</p> <p>"Yes, I gave lots of information to adults and kids."</p> <p>"Yes because I felt like I made people care more about the animals with the facts I shared."</p> <p>"Yes, because I interact with people more and show people things."</p> <p>"Yes because everyday people have learned new things from me."</p> <p>"Yes, because I feel when people leave my cart they leave with information they didn't know or wanted to know."</p>
<b>Confidence</b>	<p>"Yeah I do believe that I have made a difference as a zooguide because I know a lot more than when I first started. I'm a better "public speaker" and it has made me better."</p> <p>"Yes, I've become more comfortable speaking to the public, cooperating with new co-workers."</p> <p>"Yes, I feel like I did lots of change being a zoo guide. I talk to lots of people and also I found how to present myself to people and presenting the thing that I have in cart."</p> <p>"Yes, because I am starting to talk to visitors. Smiling to people."</p>
<b>Educate self</b>	"Yes I made a difference because I've learned so much more and learned a lot about the animals."
<b>Entertain</b>	<p>"Yes because it helps zoo guest like us here."</p> <p>"Yes, because I feel we make people's days better."</p>

Would you return as a guide next year? Why or why not?	
Key Theme or Phrase	Response
No	<p>"No, not because I dislike the program (I love it), but because I need more money than what this job can offer."</p> <p>"No because I have bad feet and were not allowed to sit down."</p> <p>"No, I have college and a new job I'm going to do but I have learned a lot from working here."</p> <p>"No because I am going to college but I would like to work in the zoo. I just like the view, and also the work place."</p> <p>"I cannot return next year as a zooguide because I have graduated high school."</p> <p>"No, graduated."</p>
Yes	<p>"I would return next year because it has been a good experience and I've learned a lot along the way and increased the way I learn, etc."</p> <p>"Yes because I enjoy working at the zoo and almost everyday I learn something new."</p> <p>"Yes I'm a good worker."</p> <p>"Yes, because it is a very educational and helpful program."</p>
Not sure	<p>"Honestly, I'm not sure because I feel like we got treated like we are very young children that can't do stuff on our own."</p> <p>"Depends if a better job comes up."</p> <p>"Idk?"</p>
I would if I could	<p>"Yes I would but I can't because I'll be shipping off."</p> <p>"I would but I can't cause I graduated high school."</p>

# APPENDIX L: RETURNING ZOO GUIDE INTERVIEW RESPONSE CODEBOOK

Why did you decide to return as a guide?	
Key Theme or Phrase	Response
Fun	"We've had fun in the previous years, so I decided to try it out."
Positive Experience	"It was a good experience and I love it here."
Interacting with people	"I just like meeting the people here. Honestly other than that it would be, I like working with kids and teaching them about mammals or something".
Leadership	"I wanted to have a senior position on something. I thought it would be cool to be able to supervise."
What was your experience your first year as a guide?	
Key Theme or Phrase	Response
Previously fun, now a waste of time	"It was fun. I did have fun, but now it doesn't feel really. I don't know, I'm starting college, it feels like I'm wasting my summer."
Gained knowledge	"It was good, It was fine. I did a lot of new things, I learned a lot new things." "I enjoyed learning about the zoo, I learned about pretty much every animal at the zoo." "I learned a lot about like most animals here."
Gained respect for the zoo	"I gained a lot of respect, more respect, for the zoo than you have as just a visitor."
Gained skills	It like really helped me know like public speaking skills.
How has your life changed as a result of a guide	
Key Theme or Phrase	Response
Maturity	"I've probably matured."
Environmentally aware	"I'm more aware towards the environment and animals, now that I know more like about them."
Improved skills	"Just better public speaking I guess." "I definitely have better time management and balancing, between athletics school, and work."

Do you feel more prepared for more jobs as a result of being a guide?	
Key Theme or Phrase	Response
Maturity	"So yeah, I'm more polite, I was a lot more off when I was younger. The job helped, so."
Confidence in speaking with many different people	"I believe so, only because I've talked to a lot of visitors, so now I have the experience of talking with strangers." "Yeah I work with people better. I've had to work and interact with many different people from different countries or schools."
Gained workplace skills	"Yes. This job has set you up in a professional manner so now the way you know what's expected of you in the workforce"
Does not feel more prepared	"I felt I was already prepared cause after high school I'm leaving for the marines so I'm already on track for that."

APPENDIX M: SUPERVISOR INTERVIEW RESPONSE CODEBOOK FOR MAY

<b>May</b>		
<b>Supervisor 1</b>		
<b>Category</b>	<b>Level</b>	<b>Response</b>
Interaction With Guests	Good	"They're interacting well with the public"
Interaction With Each other	Good	"The group is bonding well"
Skills	Bad	"They don't take the first step. It will take time as they don't feel as confident"
Attitude	N/A	N/A
<b>Supervisor 2</b>		
<b>Category</b>	<b>Level</b>	<b>Response</b>
Interaction With Guests	N/A	N/A
Interaction With Each other	Some bad, some good	"They have a few bumps with each other, but it's nothing out of the ordinary."
Skills	Ok	"They're progressing. Some dive right in, some are shy. But they're opening."
Attitude	Bad	"Some are new with each other. There was an incident last weekend with the boys telling the girls what to do"

APPENDIX N: SUPERVISOR INTERVIEW RESPONSE CODEBOOK FOR JUNE,  
JULY, AND AUGUST

June		
Supervisor 1		
Category	Level	Example
Interaction With Guests	Some better, some same	"Some have gotten right in. Some are still shy and will let people walk by"
Interaction With Each other	Same	"Having seniors is great. That's where the Juniors get most of their information from"
Skills	Better	"They're much better than how they started off"
Attitude	Better	"All have grown in some way"
Supervisor 2		
Interaction With Guests	Same	"Some are still shy. People need to walk away with one fact and some are still struggling with that."
Interaction With Each other	Some better, some same	"They're focused on working and get along well. There's one [guide] they're all not crazy about, but they'll do it."
Skills	Better	"They know how to explain things better."
Attitude	Better	"There are no behavior problems, and there were in the past."

July		
Supervisor 1		
Interaction With Guests	Some better, some same	"Most are using hooks to get visitors interested in the biofacts."
Interaction With Each other	N/A	N/A
Skills	Better	"But I would say a lot of them have improved their knowledge of the animals"
Attitude	Some better some worse	"...a few have shown evidence of what Nate calls 'summer slump'. Which basically means not putting forth 100% effort, not engaging with the public, etc....I have heard positive feedback from keepers, other zoo staff, and visitors."
Supervisor 2		
Interaction With Guests	Better	"They are more comfortable talking to visitors."
Interaction With Each other	Some better, some same	"As a group, they get along well for the most part."
Skills	N/A	N/A
Attitude	Better	"As for attendance that has also improved a lot."



<b>August</b>		
<b>Supervisor 1</b>		
Interaction With Guests	Some better, some same	"She's not just spitting out facts, it sounds like an actual keeper talk and people want to stay and listen. One third have gotten to that point."
Interaction With Each other	Better	"But most have done a good job. I really enjoyed working with them."
Skills	Better	"One third have done a good job. Visitors become knowledgeable, but it's still formal, still stiff. But they've learned enough".
Attitude	Some better, some same, some worse	"Some only care about appearance. Some look at their cell phones. But most have done a good job."
<b>Supervisor 2</b>		
Interaction With Guests	N/A	N/A
Interaction With Each other	Better	"I think on a whole it was a good group."
Skills	Better	"I believe we made some of them more responsible in terms of having a job and getting there for their shift on time etc."
Attitude	Some better, some worse	"There were a couple that checked out at the end, didn't show, or asked for a lot of time off."

## APPENDIX O: CONSENT FORM 1

### *High School Wildlife Education Through a First Job Experience*

My name is Jade Johnson and I am a graduate student at SUNY College of Environmental Sciences and Forestry. I am inviting you to participate in a research study. Involvement in the study is voluntary, so you may choose to participate or not. This sheet will explain the study to you and please feel free to ask questions about the research if you have any. I will be happy to explain anything in detail if you wish.

I am interested in learning more about informal biology education programs. You will be asked to complete a survey at the end of the summer 2017 work season. This survey will take about 20 minutes of your time. You will also be asked to complete a journal entry during staff meetings once a month in May, June, July, and August. Each journal entry will take about 10 minutes of your time. Your survey responses and journal entries will be kept *confidential*. This means that your name will not appear anywhere and your specific answers will not be linked to your name in any way. They will only be linked to each other with a code and only my faculty advisor and I will have the key for the code. The envelope containing your survey responses and the envelope containing your journal entries will be kept in a locked cabinet drawer in a locked office that only I have access to. Your survey data journal entry data will be transferred onto spreadsheets, which will be kept on my password protected computer.

Your study data will be kept as confidential as possible. This means that none of your supervisors will see your responses.

The benefit of this research is that you will be helping me study the education of first time environmental educators. This information should help me better understand the education and personal growth of young people taking on the role of an environmental educator for the first time. There are no benefits to you by taking part. There are no significant risks to you of participating in this study, other than the possibility of minor stress from responding to knowledge and personal reflection questions. This minor stress may occur if you do not know how to answer a question. If that is the case, answer to the best of your ability. You may also choose to skip any questions you do not want to answer or are not sure how to answer. None of your responses will affect your position as a zoo guide.

If you do not want to take part, you may choose not to, without penalty. If you decide to take part and later no longer wish to continue, you have the right to drop out from the study at any time, without penalty.

### Contact Information:

If you have any questions about your rights as a research participant, you have questions, concerns, or complaints that you wish to address to someone other than

the investigator, if you cannot reach the investigator, contact the Syracuse University Institutional Review Board at 315-443-3013.

All of my questions have been answered, I am 18 years of age or older, and I wish to participate in this research study. I have received a copy of this consent form

\_\_\_\_\_  
Signature of participant \_\_\_\_\_ Date

\_\_\_\_\_  
Printed name of participant

\_\_\_\_\_  
Signature of researcher \_\_\_\_\_ Date

\_\_\_\_\_  
Printed name of researcher

## APPENDIX P: ASSENT FORM 1

My name is Jade Johnson and I am from the SUNY College of Environmental Sciences and Forestry. I am asking you to participate in this research study because you are working as a zoo guide for the 2017 summer season.

**PURPOSE:** In this study, I am trying to learn more about the educational experience of zoo guides at the Rosamond Gifford Zoo. I am interested in learning about your professional and educational growth so that I might be able to improve the ZooGuides program for zoo guides like you in the future.

**PARTICIPATION:** If you decide you want to be part of this study, you will be asked to complete a survey at the end of the summer 2017 working season. This survey will take about 20 minutes of your time. You will also be asked to complete a journal entry during staff meetings once a month in May, June, July, and August. Each journal entry will take about 10 minutes of your time. When you complete the survey, you will be asked to place it in an envelope face down. Like the survey responses, when you complete a journal entry you will be asked to place it in an envelope face down. Only I will have access to your survey responses and journal entries and your supervisors will not see them. Your survey responses and journal entries will be kept confidential and they will not be linked to you or your name. They will only be linked to each other with a code and only my faculty advisor and I will have the key for the code. The envelope containing your survey responses and the envelope containing your journal entries will be kept in a locked cabinet drawer in a locked office that only I have access to. Your survey data journal entry data will be transferred onto spreadsheets, which will be kept on my password protected computer.

**RISKS & BENEFITS:** There are some things about this study you should know. You may feel that you do not know how to answer a question on a survey or journal, and that may cause minor stress. If that is the case, answer to the best of your ability. None of your responses will affect your position as a zoo guide.

Not everyone who takes part in this study will benefit. I think these benefits might be improvement in performance and confidence as a zoo guide from self- reflection and evaluation. There might also be improvement in training and working experience for the zoo guide program in the future, which you may benefit from.

**REPORTS:** When I am finished with this study I will write a report about what was learned. This report will not include your name or that you were in the study.

**VOLUNTARY:** You do not have to be in this study if you do not want to be. Your parents or guardian have already been given a consent form. Even if your parents or guardian have allowed you to participate in this study, you still get to decide if you want to be in this research study. You can also talk with your parents or guardian, grandparents, and teachers before deciding whether or not to take part. There will be

no penalties for deciding to not participate in this study. You may also decide to stop participating after the study has begun. You can also skip any of the questions you do not want to answer.

**QUESTIONS:** You can ask questions now or whenever you wish. If you are not happy about this study and would like to speak to someone other than me, you or your parents or guardian may call the Syracuse University Institutional Review Board (IRB) at 315-443-3013

**Please sign your name below, if you agree to be part of my study. You will get a copy of this form to keep for yourself.**

Signature of Participant \_\_\_\_\_ Date\_\_\_\_\_

Name of Participant \_\_\_\_\_

Signature of Investigator or Designee \_\_\_\_\_ Date \_\_\_\_\_

Printed Name of Investigator or Designee \_\_\_\_\_

## APPENDIX Q: PARENTAL CONSENT FORM 1

### *High School Wildlife Education Through a First Job Experience*

My name is Jade Johnson and I am a graduate student at SUNY College of Environmental Sciences and Forestry. I am inviting your child to participate in a research study. Involvement in the study is voluntary, so you may choose to let your child participate or not. This sheet will explain the study to you and please feel free to ask questions about the research if you have any. I will be happy to explain anything in detail if you wish.

I am interested in learning more about informal biology education programs. Your child will be asked to complete a survey at the end of the summer 2017 work season. This survey will take approximately 20 minutes of your child's time. Your child will also be asked to complete a journal entry once a month during staff meetings in May, June, July, and August. Each journal entry will take approximately 10 minutes of your child's time. All information will be kept *confidential*. This means that your child's name will not appear anywhere and your child's specific answers will not be linked to your child's name in any way. They will only be linked to each other with a code and only my faculty advisor and I will have the key for the code. The envelope containing your child's survey responses and the envelope containing your child's journal entries will be kept in a locked cabinet drawer in a locked office that only I have access to. Your child's survey data and journal entry data will be transferred onto spreadsheets, which will be kept on my password protected computer.

Your child's study data will be kept as confidential as possible, with the exception of certain information we must report for legal or ethical reasons (child abuse, elder abuse, or intent of your child to hurt him or herself, or others). If this is the case, we are obligated to notify your child's zoo supervisors.

The benefit of this research is that your child will be helping me study the education of first time educators in an informal biology setting. This information should help me better understand the education and personal growth of young people teaching wildlife and environmental topics professionally for the first time. There are no other benefits to your child by taking part. There are no significant risks to your child of participating in this study. The only risks are associated with the possibility of experiencing minor stress from being asked to respond to knowledge and self-reflection questions. This minor stress may occur if your child has difficulty answering any question. If that is the case, your child may choose to skip any questions he or she does not want to answer or is not sure how to answer

If you do not want your child to take part, you have the right to refuse to let your child take part, without penalty. If you decide to let your child take part and later no longer wish to continue, you have the right to withdraw your child from the study at any time, without penalty.

Contact Information:

If you have any questions about your rights as a research participant, you have questions, concerns, or complaints that you wish to address to someone other than the investigator, if you cannot reach the investigator, contact the Syracuse University Institutional Review Board at 315-443-3013.

All of my questions have been answered, I am 18 years of age or older, and I wish to let my child to participate in this research study. I have received a copy of this consent form

\_\_\_\_\_  
Printed name of child

\_\_\_\_\_  
Signature of parent or guardian

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed name of parent or guardian

\_\_\_\_\_  
Signature of researcher

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed name of researcher

## APPENDIX R: COSENT FORM 2

### *High School Wildlife Education Through a First Job Experience*

My name is Jade Johnson and I am a graduate student at SUNY College of Environmental Sciences and Forestry. I am inviting you to participate in a research study. Involvement in the study is voluntary, so you may choose to participate or not. This sheet will explain the study to you and please feel free to ask questions about the research if you have any. I will be happy to explain anything in detail if you wish.

I am interested in learning more about informal biology education programs. If you choose to participate in this study, you will be asked to complete a survey at the end of the summer 2017 work season. This survey will take about 20 minutes of your time. When you complete the survey, you will be asked to place it in an envelope face down. Only I will have access to your survey responses and your supervisors will not see them.

If you choose to participate in this study, you will also be asked to answer 4 short interview questions once sometime during the summer 2017 work season. The interview questions will take about 15-20 minutes of your time. All information will be kept *confidential*. This means that they will not be linked to you or your name. They will only be linked to each other with a code and only my faculty advisor and I will have the key for the code. The envelope containing your survey responses will be kept in a locked cabinet drawer in a locked office that only I have access to. Your survey data will be kept on a spreadsheet on my password protected computer.

Your study data will be kept as confidential as possible. This means that none of your supervisors will see your responses.

Your interviews will be audio recorded using a tape recorder. This is so that I can collect complete responses to interview questions. Your supervisors will not hear these recordings. Only I will have access to these recordings and on the same day they are recorded, I will transfer responses onto a word document and recordings will be erased.

The benefit of this research is that you will be helping me study the education of first time environmental educators. This information should help me better understand the education and personal growth of young people taking on the role of an environmental educator for the first time. There are no other benefits by taking part. There are no significant risks to you by participating in this study, other than the possibility of minor stress of responding to knowledge and personal reflection questions. This minor stress may occur if you do not know how to answer a question. If that is the case, answer to the best of your ability. You may also choose to skip any questions you do not want to answer or are not sure how to answer. None of your responses will affect your position as a zoo guide.



If you do not want to take part, you may choose not to, without penalty. If you decide to take part and later no longer wish to continue, you have the right to drop out from the study at any time, without penalty.

Contact Information:

If you have any questions about your rights as a research participant, you have questions, concerns, or complaints that you wish to address to someone other than the investigator, if you cannot reach the investigator, contact the Syracuse University Institutional Review Board at 315-443-3013.

All of my questions have been answered, I am 18 years of age or older, and I wish to participate in this research study. I have received a copy of this consent form.

\_\_\_\_\_  
Signature of participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed name of participant

I agree to be audio taped \_\_\_\_\_

I do not agree to be audio taped \_\_\_\_\_

\_\_\_\_\_  
Signature of researcher

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed name of researcher

## APPENDIX S: CHILD ASSENT FORM 2

My name is Jade Johnson and I am from the SUNY College of Environmental Sciences and Forestry. I am asking you to participate in this research study because you are working as a zoo guide for the 2017 summer season.

**PURPOSE:** In this study, I am trying to learn more about the educational experience of zoo guides at the Rosamond Gifford Zoo. I am interested in learning about your professional and educational growth so that I might be able to improve the ZooGuides program for zoo guides like you in the future.

**PARTICIPATION:** If you decide you want to be part of this study, you will be asked to complete a short survey at the end of the summer 2017 working season. This survey will take about 20 minutes of your time. When you complete the survey, you will be asked to place it in an envelope face down. Only I will have access to your survey responses and your supervisors will not see them. Your survey responses will be kept confidential and they will not be linked to you or your name. They will only be differentiated from other guides' surveys with a code and only my faculty advisor and I will have the key for the code. The envelope containing your survey responses will be kept in a locked cabinet drawer in a locked office that only I have access to. Your survey data will be kept on a spreadsheet on my password protected computer.

If you decide you want to be a part of this study, you will also be asked to answer 4 short interview questions at some point during the summer 2017 working season. Interview questions will take about 15-20 minutes of your time. Interviews will be audio recorded using an audio recorder. This is so that I can collect complete responses to interview questions for data analysis. Your supervisors will not hear these recordings. Only I will have access to these recordings and on the same day they are recorded, I will transfer responses onto a word document and recordings will be erased. A number will be assigned to your interview word document so that it will be kept confidential and the document will be kept on my password protected computer.

**RISKS & BENEFITS:** There are some things about this study you should know. You may feel that you do not know how to answer an interview or survey question, and that may cause minor stress. If that is the case, answer to the best of your ability. You may also choose to skip any questions you do not want to answer or are not sure how to answer. None of your responses will affect your position as a zoo guide.

Not everyone who takes part in this study will benefit. I think these benefits might be improvement in performance and confidence as a zoo guide from self- reflection and evaluation. There might also be improvement in training and working experience for the zoo guide program in the future, which you may benefit from.

**REPORTS:** When I am finished with this study I will write a report about what was learned. This report will not include your name or that you were in the study.

**VOLUNTARY:** You do not have to be in this study if you do not want to be. Your parents or guardian have already been given a consent form. Even if your parents or guardian have allowed you to participate in this study, you still get to decide if you want to be in this research study. You can also talk with your parents or guardian, grandparents, and teachers before deciding whether or not to take part. There will be no repercussions for deciding to not participate in this study. You may also decide to stop participating after the study has begun. You can also skip any of the questions you do not want to answer.

**QUESTIONS:** You can ask questions now or whenever you wish. If you are not happy about this study and would like to speak to someone other than me, you or your parents or guardian may call the Syracuse University Institutional Review Board (IRB) at 315-443-3013.

**Please sign your name below, if you agree to be part of my study. You will get a copy of this form to keep for yourself.**

Signature of Participant \_\_\_\_\_ Date \_\_\_\_\_

Name of Participant \_\_\_\_\_

I agree to be audio taped \_\_\_\_\_

I do not agree to be audio taped \_\_\_\_\_

Signature of Investigator or Designee \_\_\_\_\_ Date \_\_\_\_\_

Printed Name of Investigator or Designee \_\_\_\_\_

## APPENDIX T: PARENTAL CONSENT FORM 2

### *High School Wildlife Education Through a First Job Experience*

My name is Jade Johnson and I am a graduate student at SUNY College of Environmental Sciences and Forestry. I am inviting your child to participate in a research study. Involvement in the study is voluntary, so you may choose to allow your child to participate or not. This sheet will explain the study to you and please feel free to ask questions about the research if you have any. I will be happy to explain anything in detail if you wish.

I am interested in learning more about informal biology education programs. Your child will be asked to complete a survey at the end of the summer 2017 work season. This survey will take 20 minutes of your child's time. When your child completes the survey, he or she will be asked to place it in an envelope face down. Only I will have access to his or her survey responses and your child's supervisors will not see them.

Your child will also be asked to answer 4 short interview questions sometime during the summer 2017 work season. Interview questions will take approximately 15-20 minutes of your child's time. All information will be kept *confidential*. This means that your child's name will not appear anywhere and your child's specific answers will not be linked to your child's name in any way. They will only be differentiated from other participants' responses with a code and only my faculty advisor and I will have the key for the code. The envelope containing your child's survey responses will be kept in a locked cabinet drawer in a locked office that only I have access to. Your child's survey data will be kept on a spreadsheet on my password protected computer.

Your child's study data will be kept as confidential as possible, with the exception of certain information we must report for legal or ethical reasons (child abuse, elder abuse, or your child's intent to hurt him or herself, or others). If this is the case, we are obligated to notify your child's zoo supervisors.

Your child's interviews will be audio recorded using an audio recorder. This is so that I can collect complete responses to interview questions. Only I will have access to these recordings. Your child's supervisors will not hear these recordings. The same day they are recorded, I will transfer responses onto a word document and recordings will be erased.

The benefit of this research is that your child will be helping me study the education of first time educators in an informal biology setting. This information should help me better understand the education and personal growth of young people teaching wildlife and environmental topics professionally for the first time. There are no other benefits to your child by taking part. There are no significant risks to your child by participating in this study, other than the possibility of minor stress of responding to knowledge and personal reflection questions. . This minor stress may occur if your child has difficulty answering any question. If that is the case, your child may choose to skip any questions he or she does not want to answer or is not sure how to answer

If you do not want your child to take part, you have the right to refuse to let him or her take part, without penalty. If you decide to let your child take part and later no longer wish to continue, you have the right to withdraw your child from the study at any time, without penalty.

Contact Information:

If you have any questions about your rights as a research participant, you have questions, concerns, or complaints that you wish to address to someone other than the investigator, if you cannot reach the investigator, contact the Syracuse University Institutional Review Board at 315-443-3013.

All of my questions have been answered, I am 18 years of age or older, and I wish to let my child participate in this research study. I have received a copy of this consent form.

\_\_\_\_\_  
Printed name of child

\_\_\_\_\_  
Signature of parent or guardian

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed name of parent or guardian

I agree to let my child be audio recorded \_\_\_\_\_

I do not agree to let my child be audio recorded \_\_\_\_\_

\_\_\_\_\_  
Signature of researcher

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed name of researcher

# **RESUME**

**Jade Johnson**

## **Education**

State University of New York, College of Environmental Sciences and Forestry  
Masters of Science in Environmental Interpretation Expected 2018  
GPA: 4.0/4.0

Binghamton University, State University of New York, Graduated 2016  
Bachelors of Science in Ecology, Evolution, and Behavior, Minor in Education  
GPA: 3.47/4.0; Dean's List: Fall 2012, Spring 2013, Fall 2014, Spring 2015, Fall 2015, Spring 2016

## **Skills**

Microsoft word and excel, basic quantitative and qualitative data analysis, large data set organization, guest and visitor relations, genetics and genomics lab work, urban ecology fieldwork, forest restoration, informal education, program evaluation, policy and literature review writing, fine art, and educational program and activity development.

## **Relevant Experience**

Research Assistant for Dr. Robin Kimmerer- SUNY ESF- May 2017- December 2017

- Quantitative and qualitative data analysis of surveys given to high school and middle school students for the Thanksgiving Address project

Summer Camp Counselor- Milton J. Rubenstein Museum of Science and Technology- July 2017-August 2017

- Assisted camp director in set up and clean up of activities
- Organized and engaged campers through activities

Nature in the City Intern- Baltimore Woods Nature Center- May 2017- June 2017

- Assisted in classroom management during programs for Syracuse City School District's 3<sup>rd</sup> grade classrooms and stream explorations
- Led nature education programs in 3<sup>rd</sup> grade classrooms
- Set up and broke down for all 3<sup>rd</sup> grade Nature in the City programs

Graduate Teaching Assistant- SUNY ESF

- General Biology Lab – Fall 2016, Fall 2017
- Cranberry Lake Field Course (Nature Journaling)- Summer 2017
- Comparative Vertebrate Anatomy- Spring 2017
- Applied Wildlife Science – Spring 2017

American Universities International Programs in NZ/AU- Conservation Service Learning- May 2015–June 2015

- Mountainside restoration
- Rainforest habitat and coral reef surveying and restoration

Research Assistant for Dr. Anne Clark and her Crow Behavior Research Group – January 2014–May 2016

- Incorporated feedback from professor
- Compiled data on behavioral patterns of juvenile foraging behavior
- Analyzed learned urban behavior of juvenile crows
- Assisted with net trapping and tagging of wild American crows

American Museum of Natural History- Global Felid Genetics Program- June 2014–August 2014

- Collected and extracted DNA from felid samples
- Assisted in sequencing sample DNA for species identification
- Organized all collection and sequencing information for each sample received by the Global Felid program

Binghamton Zoo at Ross Park- Education Intern- September 2013–December 2013

- Helped set up for and supervise events
- Gave live animal demonstrations
- Observed multi-species interactions in an unnatural environment
- Organized the education office so that it was easier to find documents such as activity books for events

American Museum of Natural History- Museum Education Employment Program- June 2013–August 2013

- Developed and wrote a tour for camp groups
- Presented my tour to camp groups
- Taught visitors at interactive carts
- Supervised and organized other tour guides and camp groups

Prospect Park Zoo, Brooklyn, NY- Discovery Guide- June 2010–August 2012

- Helped curate exhibit on primates
- Behavioral observation & research on baboons
- Assisted with summer camps and tours for visiting summer campers
- Engaged with the public at exhibits

New York Hall of Science, Queens, NY- Explainer- April 2010–March 2012

- Explained exhibits and interacted with visitors.
- Scientific demonstrations and cart demos

## **Other Relevant Positions**

Graduate Student Board Member- Friends of Beaver Lake Nature Center Board of Directors-  
October 2016–Present

## **Certifications**

Certified Interpretive Guide- National Association for Interpreters- April 2017

Project WET Workshop- New York State Department of Environmental Conservation- November 2016

Project WILD Workshop- New York State Department of Environmental Conservation- October 2016

Project Learning Tree Prek-8 Educator Professional Development Training- NY Project Learning Tree and NYS Department of Environmental Conservation- September 2016

Social/Behavior Research Course- Collaborative Institutional Training Initiative- September 2016

Foundations of Interpretation- Indiana University Eppley Institute for Parks and Public Lands- September 2016